

ATARI EXPLORER

THE OFFICIAL ATARI JOURNAL

NOVEMBER/DECEMBER 1987
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A Hands-On Look At The New Mega ST

John Skruch: The Future Of 8-Bit Ataris

Racing Toward Superconductivity

5 1/4" Disk Drives For The ST

Teletalk: Update On Delphi

Make Your Own ST Connector Cables

Handbook For 8-Bit Adventurers

Reviews:

1st Word Plus

Alice Pascal

Tackle Box

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BREACH

"I was moving a squad of four of my best through the *kehst*-beridden jungles of Kiskismok, when suddenly Darrow's detector picks up what looks like a couple of life forms 50 meters out."

"'Nothin' but a couple of those brachiators,' he says to me. Just then Darrow takes it through the chest."

"We all drop into the mud, flipping through our helmet displays trying to find out where the shot came from when I hear this rumbling. More like I feel this rumbling. An' then there it is. A battle robot."

"Hsiang shoots the thing in its sensory grid with a bolt, but it doesn't do much good 'cause he's a psionic talent and they don't give 'em half-way decent guns. It starts tracking him with its dual guns and suddenly he takes some hot plasma too. Now it's just me and the kid, Yamaguchi."

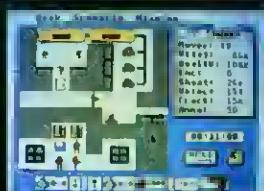
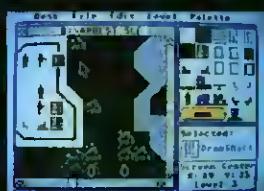
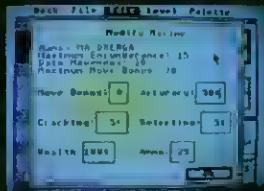
"'Guchi,' I said, 'Direct your fire into the lifters so it can't move. These things are pretty lousy about protecting their undersides.' So like he was a vet of 20 drops, he rises to one knee and hits the thing right in the lifters. And then he does it twice more."

"'One battle robot: out of action,' he says. I toss an energy grenade at the hulk just to make sure and then we start the long job of carrying the boys north, where we know the landing boat'll be."

The Serayachi Campaign—Sgt. Robert Sherwood, FWSF Ret.

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Notes On Sound Chip

Dear Editor:

I am writing about your "Sound Chip" series, which I have been enjoying immensely. Being a practicing musician, I have had the pleasure of being involved with synthesizers since my first exposure to them in the late sixties.

In my studio I use (what else?) an Atari 1040ST with Dr. T. KCS-ST (Keyboard Controlled Sequencer), and I must say it is a very powerful combination. I can do just about anything I want with it, but, frankly, I never had the slightest idea of how it worked.

Reading your articles has given me some understanding of the process and has provided some useful information about the way synthesizers talk to computers.

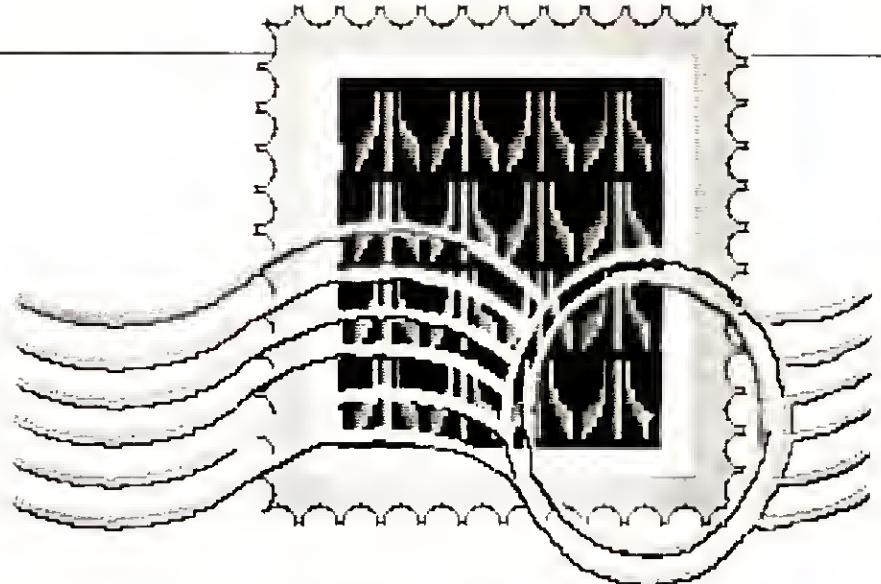
In the Summer 1987 issue, however, I noticed some unclear statements about some functions and features of synthesizers, that I hope I can clear up.

In the article, you write about "The portamento range controlled by the pitch wheel . . ." The fact is that portamento and pitch bend are two different and independent effects, each with its own control. The pitch bend has the Bend Range control, and the portamento has its own Portamento Time control. And one will not affect the other. Of course, I know that you meant to say that the master synth will not affect the Bend Range of the slave synth(s)—which is a true statement.

Further, you state that "Polyphonic Key Pressure messages are sent by sophisticated synthesizers capable of distinguishing how hard an individual key is being held down." That is not correct.

Polyphonic Key Pressure, which is better known as velocity, does *not* measure how hard a key is being held down. Rather, it senses how hard a key is struck; that is, it deals only with the attack. Because we know that to hit a key harder, one must hit it faster, at a higher speed, and that another word for speed is velocity, we can understand why such synths are said to be velocity sensitive.

You then assert that "Channel Pressure messages are sent by less sophisticated synths and reflect the pressure on the key that is being held down the hardest." Channel Pressure, better known as aftertouch, is actually found in rather expensive synthesizers, like the Yamaha DX-7 and top-of-the-line Korg



Letters To The Editor

synths. Therefore, it is not a sign of greater or lesser sophistication—certainly not less.

But most importantly, you did not explain the function of aftertouch. So, just for the record, here it is: a synth is said to be pressure sensitive when it is possible to turn its modulation on by adding slight additional pressure to a key that is being held down. This can also be accomplished by turning the modulation wheel, which you also neglected to mention.

Finally, in your description of the MIDI mode Omni Off/Mono On, also known as MIDI mode 4, you forgot to mention that for a synth to even go into mode 4 it has to be multi-timbral; otherwise it will work only in modes 1 and 2. You wouldn't want all the nice folks at home to go nuts trying to get their non-multi-timbral synths to work in mode 4, would you?

I hope I have been of some help. Keep up the good work!

Giampiero Seuderi
1112 N. Bell, Apt. 6
Denton, TX 76201

Qix In The Pants

Atari Explorer Editorials:

I am writing about the article in your Summer 1987 issue titled "Helix." I don't own an ST, but it was interesting all the same.

It seems that nobody at Atari knows what a helix is, since this word has been repeatedly misused. Recently, I got myself a copy of *Qix*. This is a really fun game, but the manual refers to the *Qix*

as a "helix." This is not correct: *Qix* is a bundle of lines that pulse around. This is not what a helix is. Atari should have made up a word for this figure instead of misusing "helix."

Then I read your article in *Atari Explorer*. You make the same mistake and again misuse "helix." Does everyone connected with Atari have such a one-track mind that they don't even know basic geometric terms.

As an aside, you use the barbarism "helices." The proper plural is "helices." I guess no one connected with Atari knows any English either.

It is hard to define a helix precisely. If you wrap a line around a cylinder, the line is a helix. Springs, slinkies, and telephone handset cords are good examples. The famous DNA molecule is the shape of two helices wrapped around the same cylinder.

I'd really appreciate you passing this on to your readers. It's important that this myth be disposed of.

Dave Toyanev

Thanks for setting us straight about the helix. You are, of course, correct. We were careless, and we hereby request that all readers open their copies of the Summer issue to page 72 and change the title of the article found thereon to "Bundle of Stix."

As for barbarisms, our dictionary lists both "helices" and "helices" as correct plurals for "helix." And while we are in semantic hairsplitting mode, let's talk about "editorials," which are magazine articles that express the opinions of the people who create the magazine, who usually prefer to be called "editors."

ATARI EXPLORER

THE OFFICIAL ATARI JOURNAL

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Make the News

HEADLINES

THE PUBLICATION OF DEDICATED EASY-DRAW USERS • VOLUME I • ISSUE I



A photograph of a tiger, one of many images that can be scanned and printed with the HP Series II laser printer.

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Continued on page 4

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Letters To The Editor

Regent's Reply

Dear Editor:

Thank you for the very nice piece on our word processor, *Regent Word II*, that appeared in your Summer 1987 issue. Your reviewer, Frank Kofsky, did a very good job getting into both word processors.

The points that Mr. Kofsky made about *Regent Word II* were both clear and concise. However, he overlooked the most fundamental concept: simplicity. *Regent Word II* was designed to be used in two phases: composition and formatting.

During the composition phase, a writer is intent only on expressing his ideas as written words. The problems involved with learning a word processor's "user interface" should be minimal. Nothing should interrupt the writer's train of thought as he composes his ideas into text.

Once the content of the document has been completed, a word processor should, using the smallest possible number of functions, produce a beautiful, professional final draft of the document. In this respect, I think that *Word Writer* falls apart and *Regent Word II* performs excellently.

Frank Cohen
President

Regent Software
7131 Owensmouth, Ste. 45A
Canoga Park, CA 91303

Dollars, Yes, But How Much Sense?

Dear Editor:

You seem to be easily pleased. Just because *Dollars and Sense* has some interesting features, in your Spring issue you find it "a sensible choice. Never mind that it doesn't work right."

You noticed that printing a report on a 520ST was considerably less than successful. I have a 520ST with a 1MB memory upgrade, and printing is simply impossible.

The program supports only one printer, the Epson FX80 (at least that's what Monogram told me). I have an "Epson-compatible" and am unable to print anything. Monogram promised to send me a new printer driver in February. I am still waiting.

Advertising for the package shows full color graphs. However, the Atari version does not produce color graphs.

The little cherry bombs appear frequently.

All in all, why would anyone want a financial software package that doesn't print or produce color graphs. This program may have been very successful on the PC, but it does not work on the Atari. For Monogram to continue selling it is one thing, for you to recommend it is astonishing.

Kurt Beck
3005 Calle Arco
San Clemente, CA 92672

Dear Editor:

After reading your review of *Dollars and Sense*, I considered buying the program for some small business applications. But because you mentioned problems with the print routines, I decided to call Monogram and find out when a new version without printing problems would be available. They told me they were not supporting this program for the 520ST.

I think mentioning this non-support to your readers would be a good idea. I'm also surprised that a company can produce a piece of software that does not work properly then decide to abandon support while that product is still being sold.

Do we have any recourse, or is it just a case of "tough luck buddy?"

Robert Amezaga
Downey, CA

We called Monogram and asked for their response to these letters and many others that expressed similar sentiments. A spokeswoman said that a revision was under development and promised to send a complete description of the revision and instructions for current owners of *Dollars and Sense*. As we go to press two months later, we are still waiting for that response.

Guidelines For Authors

Dear Editor:

I would like to have more information about submitting articles and programs to you for possible publication.

Gabriel Pagan
Box 193
Lajas, PR 00667

One of the things our small staff has not had time to prepare is a formal set of guidelines for would-be authors. So we'll take a bit of space here to discuss some of the mechanics of arti-

cle submission.

- Read the magazine and try to make the style of your article conform to the style of similar articles that have been published. For example, if you are reviewing a game, include the "report card" ratings, summary, price, and manufacturer information as they appear in every issue.

- Double-space the hardcopy of your text.

- Submit the article on disk in 1st Word format if at all possible. All programs should be submitted in machine-readable form.

- Include photographs, charts, and diagrams to illustrate your article.

- Use standard English. If you can't tell a preposition from a pronoun, find someone who can and ask him to edit your article.

- Don't submit the same article to more than one magazine at a time. Most publications, including *Explorer*, automatically reject simultaneous submissions.

ST International

Dear Editor:

About two years ago, the ST Club Eindhoven was formed out of the Atari Club Eindhoven. The main aims of that club were to stimulate the use of Atari ST computers in all possible fields in all possible ways.

We believe that computer users can benefit from swapping know-how and public domain software—if possible, all over the world. Whereas it is very possible that we know things that you would like to know, you will most certainly know things that we would like to know.

Let's build a world-wide network (by mail) of users to disseminate information about the Atari ST.

If your readers are interested in working together with the ST Club Eindhoven, they should write to:

ST Club Eindhoven
P.O. Box 1424
5602 BK Eindhoven
The Netherlands

No Such Number

A lady in Bowie, MD, called to tell us that the number given in the Teletalk list of BBSs published in the Summer 1987 issue for a BBS called The Pentagon had recently been assigned to her. Since she doesn't even have a computer, she asks that you delete The Pentagon from that list.

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Question Mark

By MARK JANSEN

Q: I have a program on a DOS 2 formatted disk. The instructions tell me to make a backup copy using my System Master disk. I have DOS 3, which doesn't seem to be able to copy it. What should I do?

A: Send your DOS 3 disk to Atari for exchange with DOS 2.5. DOS 2.5 is compatible with DOS 2.0, so there should be no problem in copying a DOS 2 based program.

Send your DOS 3 disk, along with a note indicating that you want DOS 2.5, to Atari Customer Relations, Attn: DOS 2.5, P.O. Box 61657, Sunnyvale, CA 94088.

You will receive DOS 2.5 and a mini-manual. If you want a more detailed manual, you can send an additional \$10.00 plus \$2.50 for shipping to the same address, along with a note indicating that you also want the DOS 2.5 Technical Manual.

Q: When I call the Atari BBS, it wants me to enter a password. Why is this required, and how do I get one?

A: The Atari BBS, like most telecommunications services, requires you to use a password to ensure that no other user can read mail sent privately to you and to prevent others from impersonating you on the system.

Getting a password on the Atari BBS is easy. Call the BBS with your modem and telecommunications software. Shortly after you are connected, the system will ask for your name. Type it in. If this is your first time on that particular line, the computer won't find you as a registered user. Don't panic—it will also ask if you would like to be added.

Answer with Y for Yes, and the BBS will proceed to ask you a few questions, including what password you want to use.

Choose a password that won't be easy to guess. Don't, for example, use your first name or "Atari." Some people use a word with some numbers thrown in, or two unrelated words joined by punctuation. Once you have chosen a password, keep it to yourself.

After that, you will be a registered Atari Base user, and next time, the BBS will "recognize" you!

Q: I have a third party printer that I use with my Atari 8-bit computer and *AtariWriter Plus*. Where can I get printer drivers to make this combination work?

A: With a good printer manual and some patience, you can create a printer driver yourself. Before you do that, however, you should check around at local dealers and user groups for existing drivers.

Table 1 shows the codes to enter into the *AtariWriter Plus* printer driver editor to create your own printer drivers for three popular printers.

The drivers available from Atari come from various sources—many from outside the company—so Atari cannot guarantee their performance. If you find a problem with a driver, add additional features to it, correct a bug you have found, or write a new driver, send it in. We will share it with other Atari users.

Atari Customer Relations asks that you be sure to include *all* of the following information when you request a printer driver for your ST or 8-bit computer: make and model of printer (including any other printers with which it is compatible), name of Atari program being used, and model of Atari computer. Without this information, it is very difficult to send the appropriate driver.

Send your questions to Question Mark, Atari Explorer, 7 Hilltop Road, Mendham, NJ 07945.

Table 1.

	Star SG-10	Panasonic KX-P1080	Epson RX-80
Initialize	Blank	Blank	Blank
Line feed and c/r	155	155	155
Underline off	27 45 0	27 45 0	27 45 0
Underline on	27 45 1	27 45 1	27 45 1
Backspace	8	8	8
Elongate off	27 87 0	27 87 0	20
Elongate on	27 87 1	27 87 1	14
Bold off	27 70	27 70	27 70
Bold on	27 69	27 69	27 69
Up 1/2 line	Blank	Blank	Blank
Down 1/2 line	Blank	Blank	Blank
Down 1/2 line and c/r	Blank	Blank	Blank
Return without linefeed	155	155	155
Type font 1	Pica 27 66 1	Pica 27 80	Return to normal 18 27 84 27 80 27 72 27 53
Type font 2	Condensed 27 66 3	Elite 27 77	Condensed 15
Type font 3	Proportional 112 112 1	Condensed on 15	Blank
Type font 4	Italics 27 52	Condensed off 18	Superscript 27 83 1
Type font 5	Elite 27 66 2	Italics on 27 52	Subscript 27 83 1
Type font 6	Emphasized 27 69	Italics off 27 53	Elite 27 77
Type font 7	Double Strike 27 71	Superscript on 27 83 0	Double strike 27 71
Type font 8	Expanded 27 87 1	Subscript on 27 83 1	Italics 27 52
Type font 9	NLQ 27 66 4	Super & sub off 27 84	Blank

What Next?

After the new wears off, many personal computers wind up gathering dust in a closet. Don't let your Atari be one of them.

Why did you originally buy an Atari computer? To do word processing? To compose music? To manage your business? To play games? Chances are, whatever your initial reason for buying an Atari, you've discovered that it has many additional capabilities and potential applications.

The flip side of the coin is that you've probably experienced some frustration as well. Maybe your word processing package won't do subscripts or underlining. Perhaps your database won't sort on as many fields as you need. Or, it could be that when you write a program, your whole system acts user-hostile.

Depending upon the balance between your satisfaction and your frustration, you may continue to use your computer or set it aside. But there is a better way: **Atari Explorer** magazine.

As the premier magazine for Atari computer owners, it is our responsibility to make sure that you get the most out of your computer. To us, that means making sure that your Atari does more than you bought it to do, more than friends and associates' computers do, and, indeed, more than you ever imagined that a computer could do.

To make sure that you get the most out of

your computer, **Atari Explorer** brings you objective, in-depth reviews of hardware and software; up-to-date information about new products; practical tutorials; stimulating columns; thought-provoking articles; and valuable inside information.

Hard-hitting Evaluations

At **Atari Explorer**, we obtain new peripherals and software packages as soon as they are released. We put them through their paces in our on-site laboratory and also in the environment for which they are intended: home, office, lab, or school.

Our evaluations are unbiased and accurate. We are not afraid to call a spade a spade or a lemon a lemon. Our first obligation is to you, our readers, and editorial excellence and integrity are our highest goals.

Practical and Stimulating

We know that some of our readers are beginners and others are experts. Thus, it is our responsibility to make what we publish both comprehensible to newcomers and interesting to veterans. That does not necessarily mean that the material is simple; we know you like to be challenged. What it does mean is that we provide the inexperienced

user with every possible means to seize the subject matter and make it his own.

However, we don't want the experts to be bored, so although articles are accessible to beginners, they are theoretically non-trivial, cover topics in depth, and present information on more than one level.

At **Atari Explorer**, we are intensely interested in all aspects of computing. Ours is the magazine of pragmatic applications, communicative graphics, stunning animation, mind-expanding games, and realistic simulations. We take our business seriously, but we have fun too. We are convinced that you will, too, when you go exploring with the **Atari Explorer** family.

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□ NEW PRODUCTS



ST Image Scanner

Navarone Industries has announced an image scanning package for the Atari ST that combines a Canon IX-12 image scanner with a high speed cartridge port interface, cables, and software.

ST Scan provides image scanning at 75, 150, 200, and 300 dots per inch at

speeds up to 12 seconds per page, and hardware dithering produces 32 grey levels.

The product supports several file formats, including Postscript, and is compatible with many existing desktop publishing and graphics program, including *Publishing Partner*, *Easy Draw*, and *Degas Elite*. The entire package sells \$1239.95.

Navarone Industries, 1043 Stierlin Rd., Suite 201, Mountain View, CA 94040, (415) 964-2660.

The latest hardware and software announcements for
Atari 8-bit
and ST computers

New Products

SYSTEMS SOFTWARE

Logical Design Works announces revision 2.0 of the LDW Basic Compiler for the Atari ST. Enhancements include more than 50 new basic statements to access GEM, the ability to edit, compile, and execute Basic programs without leaving LDW Basic, increased speed, static and dynamic arrays, and multi-line functions and procedures with parameters and local variables. Suggested retail price is \$89.95; upgrades to previous versions are available for \$25.

Logical Design Works, 780 Montague Expy., #403, San Jose, CA 95131, (408) 435-1445.

PRODUCTIVITY SOFTWARE

Kuma Software announces *K-Roget*, a GEM-based thesaurus program for the ST, which features more than 150,000 words and phrases. Because the program operates as a desk accessory, it can be accessed from any word processor. It also traps phonetic misspellings, offering correctly spelled alternatives. £49.95.

Also available from Kuma is an interactive database called *K-Data*, which enables ST users to merge, classify, and sort data. From two to four data files can be open simultaneously, and a report generator allows data to be printed out in user-defined formats, including labels. Mean/max summations, subheadings, headers and footers, and embedded text can also be included in report formats.

Kuma Software, Unit 12, Horseshoe Park, Pangbourne, Berkshire, RG8 7JW, England. 44-7357-4335.



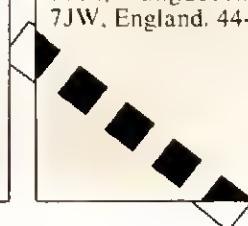
Inexpensive Printer from Seikosha

Seikosha America has announced the SP-180AI dot matrix printer designed specifically for the novice computer user.

The IBM PC-compatible printer features speeds of 100 cps in draft mode and 20 cps in NLQ mode, 129 charac-

ters and 68 graphic elements, tractor and friction feed, a variety of character attributes, and built-in margin and line space designations. Suggested retail price is \$249.

Seikosha America, 1111 Maearthur Blvd., Mahwah, NJ 07430, (201) 529-4655.



•••••••••••••••
□ NEW PRODUCTS



24-Pin Printer for Offices

Okidata announces the Microline 393, a 24-pin printer that offers four print speeds—a 450 cps high speed draft mode, a 180 cps NLQ mode, a 120 cps letter quality mode, and a 360 cps utility mode.

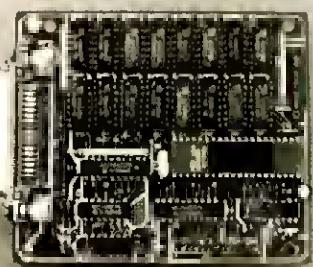
The Microline 393 prints on paper ranging in width from a 3" label to a 16" continuous form. Paper can be fed from

the bottom, rear, or top.

Standard on the printer are Centronics parallel and RS-232 serial interfaces, and in addition to its resident letter quality fonts, optional font cartridges are available. Bit image graphics can be printed at resolutions up to 360 × 360 dots per inch.

The suggested retail price of the black print only model is \$1399. The color version lists at a suggested \$1499.

Okidata, 532 Fellowship Rd., Mt. Laurel, NJ 08054, (609) 235-2600.



Epson Printer Buffer

Image Technology offers a print buffer that mounts inside an Epson printer, allowing the user to transfer data to the printer and get back to work on the computer.

A 256K buffer sells for \$133; 512K, for \$157.

Image Technology, 8150 S. Akron St., Suite 405, Englewood, CO 80112, (303) 799-6433.

Monitor Switcher

Monitor Master from Practical Solutions eliminates the need to switch cables from one monitor to another monitor or VCR. A composite jack allows use of a composite monitor or VCR (both require an ST with RF modulator) along with an RGB and/or monochrome monitor. Also included is an audio jack. Retail price is \$49.99.

Practical Solutions, 1930 East Grant Rd., Tucson, AZ 85719, (602) 884-9612.



MousePouch for Storage

The MousePouch vinyl suede pocket attaches to the side of a monitor or other convenient surface with Velcro, providing a place to store a mouse, pens, pencils, or up to eight 3½" disks.

The pouch, which measures 3½" × 3½" × 1¼", is available in either Atari grey with silver trim or natural tan with gold trim and sells for \$5.59.

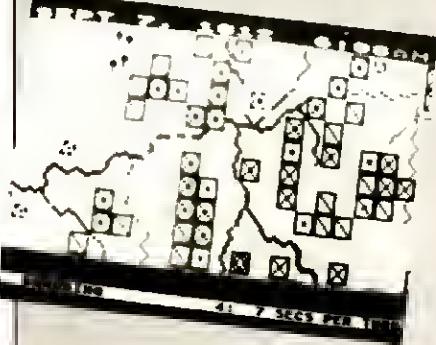
H & H Enterprises, Box 2672, Corona, CA 91718, (714) 737-1376.

□ NEW PRODUCTS

ENTERTAINMENT SOFTWARE

Artworx has released *Cycle Knight*, a program for Atari 8-bit computers that combines animation and action with strategy, fantasy, and adventure. The game features more than 2000 castle chambers, five skill levels, one- to four-player operation, and the ability to generate new castles. \$19.95.

Artworx Software Company, 1844 Penfield Rd., Penfield, NY 14526, (716) 385-6120, (800) 828-6573.



Borodino: 1812 is a detailed recreation of that famous battle between Napoleon's Grande Armee and the Russian Army. The 8-bit game from Krentek Software features eight historical and what-if scenarios, joystick control, variable speed, three levels of play, optional use of fatigue and morale, and the ability to save games. \$59.95.

Krentek Software, 5401 N. 10th, Suite 214, McAllen, TX 78504, (512) 682-9598.

Accolade has released *Test Drive*, a driving simulation for the Atari ST that allows players to test drive a Ferrari Testarosa, Lamborghini Countach, Lotus Esprit Turbo, and several other sports cars. The object of the game is to



drive different sections of highway within a certain time limit. \$44.95.

Accolade, 20813 Stevens Creek Blvd., Cupertino, CA 95014, (408) 446-5757.

Firebird has announced *Universal Military Simulator* for the Atari ST. The program allows the player to set up his own battle scenarios in terms of locale, geographical features, armaments, troops, opposition, and other variables. \$44.95.

Firebird Licensees, P.O. Box 49, Ramsey, NJ 07446, (201) 934-7373.



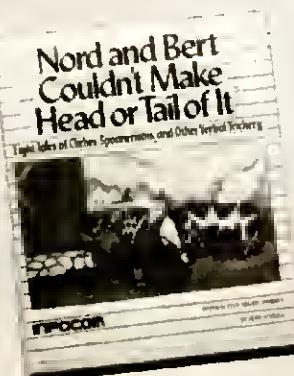
Sublogic announces *Scenery Disk #1* for Atari ST computers. The disk,

which must be used with *Flight Simulator II*, covers the central Great Lakes area of the US, including Detroit, Pittsburgh, and Niagara Falls. \$24.95.

Sublogic Corporation, 713 Edgebrook Dr., Champaign, IL 61820, (217) 359-8482, (800) 637-4983.

PBI Software announces an Atari ST version of *Strategic Conquest*, a war strategy and tactics game in which the player, as commander-in-chief of an army, navy, and air force, must explore and conquer a vast unknown world. \$39.95.

PBI Software, 1163 Triton Dr., Foster City, CA, 94404, (415) 349-8765.



Bert and Nord Couldn't Make Head or Tail of It is a new ST game from Infocom. The program features eight short stories, each of which presents a series of word-play puzzles for the player to solve. \$39.95.

Infocom, 125 Cambridge Park Dr., Cambridge, MA 02140, (617) 492-6000.

EDUCATIONAL SOFTWARE

Electronics Arts has announced *Mavis Beacon Teaches Typing*, an advanced typing tutor for both 8-bit and ST Ataris. The program boasts a detailed keyboard with animated hands that type along with the student and allows teachers to create individual lessons based on specific student problems and progress. The 8-bit program sells for \$39.95, and the ST version for \$44.95.

Electronic Arts, 2755 Campus Dr., San Mateo, CA 94403, (800) 448-8822.

Hi Tech Expressions has released three pre-school programs developed by Children's Television Workshop for Atari XL/XE computers. *Astro-Grover* is a numbers game, using counting, adding, and subtracting skills; *Ernie's Magic Shapes* is a shape and color matching game; and *Big Bird's Special Delivery* is a matching game using object recognition and classification skills. All are priced at \$9.95.

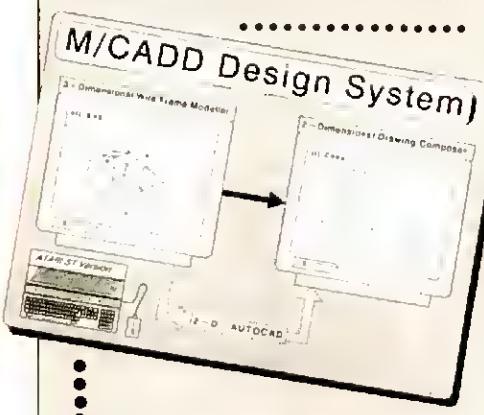
Hi Tech Expressions, 1700 NW 65th Ave., Suite 9, Plantation, FL 33313, (305) 584-6386, (800) 848-9273.



•••••••••••••••••••••
□ NEW PRODUCTS

GRAPHICS AND DESKTOP PUBLISHING SOFTWARE

Migraph has released *M/CADD*, a professional engineering graphics design system for the Atari ST. The program provides the user with the capability to do 3D wire frame modeling as well as 2D drafting. The two independent packages, *JIL-Comp* (\$299.95) and *JIL-Mod*, that form the *M/CADD* system are linked through an associative database, which allows the user to make



changes in the 3D modeler and have them reflected in the 2D drafting section.

Migraph, 720 S. 333 St., Suite 201, Federal Way, WA 98003, (206) 838-4677.

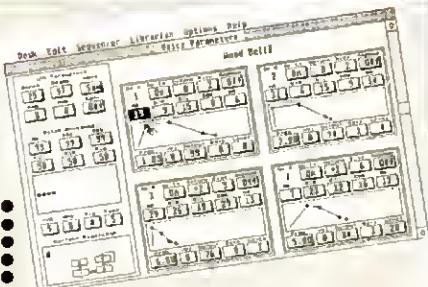
A collection of new fonts and borders for *Printmaster Plus* has been announced by **Unison World**. *FONTS and BORDERS* for the Atari ST offers users access to 20 type fonts, ranging in size from 12-point to 60-point, and 20 borders, several for specific holidays and special occasions. The program sells for \$34.95.

Unison World, 2150 Shattuck Ave., Suite 902, Berkeley, CA 94704. (415) 848-6666.

Font Partner from **Interactive MicroSystems** is a full-featured font creation program for use with *Publishing Partner*. It works with both color and monochrome monitors and sells for \$24.95.

Interactive MicroSystems, P.O. Box 1188, Canyon Country, CA 91351, (805) 298-7357.

SOUND SOFTWARE



Synchro-Systems introduces *DX-Mate*, an integrated computer-aided voicing system for the Atari ST. The system, which includes a voice editor, voice generator, sequencer, and voice and bank librarian, facilitates programming of digital FM synthesizers by displaying all parameters of voice on the high-resolution monochrome Atari screen at one time. It works with Yamaha DX21, DX27, and DX100 synthesizers and sells for \$99.

Synchro-Systems, P.O. Box 3093, Saskatoon, Sask., S7K 3S9, Canada.

ATARI ST*

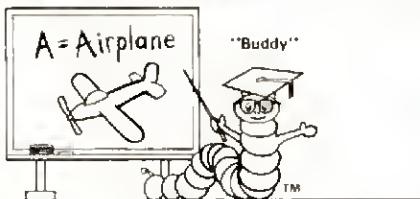
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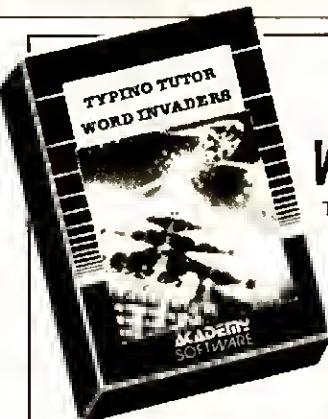
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**Our editor-on-the-scene talks to Atari's John Skruch
about the XE Game System
and its impact
on the future
of other 8-bit
systems**

Inside Atari

By MARK JANSEN

John Skruch began his relationship with Atari computers in 1982 when he bought his first computer, an Atari 400, for \$247. Today, he is in charge of Atari software testing worldwide and software operations in the U.S.

His most recent project was the oversight of the creation of Atari's XE Game System, a 65XE-based video game/computer system that runs all XE software and expands the user base of Atari 8-bit computers. We stopped by his office recently to get his views on the new machine and its effect on the future of the other 8-bit systems, a topic that our readers tell us is of great importance to them.

Atari Explorer: Where do the Atari 8-bit computers fit into the current computer marketplace as you see it, John?

John Skruch: In the United States, we tend to have a "horsepower" mentality—my dog's bigger than your dog, etc. More RAM and a faster clock speed are perceived as necessities. In reality, I know of very few people here in the U.S. who have fully utilized the capabilities of an 800XL.

People are naturally intrigued by the latest, newest thing; they succumb to

the "technology blahs." Eight-bit computers have been around for a while and are not considered new or intriguing, so they look for something newer.

The way I think they should look at them is like appliances. When considered as an appliance, like a toaster or a microwave oven, a 6502-based machine is plenty powerful for the things Joe Average wants to do at home.

Witness the continuing sales of Apple IIIs, Commodore 64s, and Atari 8-bit computers. Many people realize that 8-bit computers are all they really need.

When they decide to buy a computer, most people begin by asking "which computer should I buy?" when they should be asking "what do I really need?"

The XE system is inexpensive. In fact, it's the only computer system from a major manufacturer available for under \$100. Software for the XE isn't point-and-click like on the ST, but it is still ready to do the job.

A great many excellent games, educational programs, and productivity packages are currently available for the XE, so the essence of the computer purchase decision remains "what are you going to do with it?" If you want a

computer that the kids can play with and that will also allow you to do word processing, the XE is an admirable choice.

8-Bit Computers Compared

AE: What makes the XE better than other 8-bit computers like the Apple II or Commodore 64?

JS: The Apple II lacks the custom graphics and sound chips the XE has, so the best sounds it can manage are somewhat primitive squeaks and burps, and it can't easily put more than four colors on the screen. In terms of clock speed, the XE is almost twice as fast as the Apple II.

People are always talking about the cards you can plug into an Apple II, but they forget that there are plenty of neat things you can plug into an XE. There is also an incredible price difference between the XE and the Apple.

The Atari XE/Commodore 64 comparison, isn't quite as "night and day." The 64's disk drive is notoriously slow compared to the drive on the XE, and the XE is much less expensive. I think the XE is a much better value, costing about half what a 64 does.

AE: What are the most exciting new developments you see coming about for the XE?

JS: I think the replacement for the 1050 drive, the XF551, is very significant. It gives the XE a true double-density drive, which is something that has not even been attempted by Atari since Old Atari talked about the 815 drive back in about 1979.

The 80-column card, the XEP80, and a direct-connect 1200 baud modem, the SX212, are both significant pieces of hardware from Atari that haven't existed up to this point. We're bringing all three of these things about in 1987.

AE: How does the SX212 work with the 8-bit machines?

JS: You have a choice. You can plug it into an 850 interface module and use it as a standard Hayes-compatible modem, along with standard telecommunications software like 850 Express. Or, if you don't have an 850, you talk to it through a handler, which is similar in implementation to the T: handler used with the XM301. The software talks to the handler, and the handler talks to the modem. We have tried to set up the R: handler in such a way that you can load it, then load a program on top of it, and the software won't know the difference.

between it and talking to an 850.

We have also worked on a version of Express with Keith Ledbetter that will eliminate the steps of appending the handler to your telecommunications program, so that you can just plug it in and go. On the same disk, we have repeated what we did with the XM301, publishing the specifications of the handler to get that information into the hands of as many users as possible.

We want people to develop software specifically for the SX212, although it isn't as important here, since existing Hayes-compatible programs will work with the SX212. While we want the modem to be open-ended for those who want to write programs for it, we are also trying to appeal to people who have XM301s and want to upgrade to a 1200 baud modem. That's why we've made the "plug in and go" software package. We chose "Express" because it was the most popular telecommunications program in the 8-bit world, and we figured there must be a reason for its popularity.

AE: At one time there were rumors of a 3½" disk drive for the 8-bit line. Did that become the XF551?

JS: The 3½" disk drive we were working on made sense as long as we were going to have a 5¼" drive as well. It soon became apparent to us, however, that what the 8-bit world really needed was a better 5¼" disk drive.

This 5¼" drive has the same capacity that the 3½" drive would have had. With the 5¼" drive, you won't have people buying XEs and 3½" drives and then complaining because no software is available in that format.

A 3½" drive is certainly doable, and we may, in fact, do one somewhere down the line, but to us the immediate key was to replace the 1050 with something better. The XF551 is a drive that looks similar to an XE, runs twice as fast as the 1050, and stores three times as much.

Money in the 8-Bit Market

AE: What opportunities do you see for companies to make money in the 8-bit market?

JS: There are many new opportunities with the new hardware we have introduced. With ADOS and the XF551, someone could do a terrific database, because ADOS allows true random access files. An advanced word processor could make use of the 80-column card.

I also think it's important for compa-

nies to recognize that there is a very large installed base of Atari computers. The companies that do realize this are sitting back and laughing, because their products are generally doing well. In fact, Print Shop for the Atari 8-bits is one of Broderbund's better sellers.

AE: Another company that comes quickly to mind is ICD, which seems to be doing well supplying unique products for the 8-bit. What is your view of them?

JS: I think ICD is being smart, and we have worked closely with them. We would say, "Look, here's an opportunity for you," or they would come to us and say, "We're thinking of doing something like this . . ." If they had told us a year ago, for example, that they were planning a 1200 baud modem for the 8-bits, we would have told them to think again.

They are very good at finding niche markets—undeveloped opportunities—and that's the name of the game for marketing in the U.S. If more third party companies would realize that, instead of looking for the most obvious path, we would see a lot more new products for the XE.

AE: While we're on the subject, how

questions are very straightforward or he simply has no questions. If he is trying to do something odd, we'll certainly support him as much as possible.

In general, the questions that we get are from people who are just starting to develop for the XE. Fortunately, there is lots of good material explaining the XE and how it works. It is just not gathered together in one central volume.

The XE Game System

AE: Let's talk about your latest project, the XE Game System. How did it come about?

JS: The interesting thing is that there are still many people who are *cyberphobic*—who don't think they want to deal with computers at any level. We went to the major retailers in the U.S. with a 65XE in one hand and an XE Game System in the other and said, "Here, we'll give you a low-priced computer or a high-priced video game. Which would rather have?" They said, "We'll take hundreds of thousands of the high-priced video game." We said, "Okay!" and proceeded to build the XE Game System.

From a personal viewpoint, I look at it as a sneaky way to get computers into as many households as possible, because even people who think computers are

"I know of very few people here in the U.S. who have fully utilized the capabilities of an 800XL."

does Atari support companies that are developing for the 8-bit computers?

JS: We support third party developers for the 8-bit as much as possible, but it's less visible than our support for the ST. XE developers have already gone through the initial learning curve from which ST developers have more recently emerged.

Phones aren't ringing off the hook for ST developers like they once were when everyone was running around trying to figure out this new machine. Now they have found their way around the machine, and it's usually only the odd question that comes up.

The Atari 8-bit series has been around since the late seventies, so when I'm working with a developer of 8-bit products, I usually find that either his

scary should have them. The computer slides in the door in the guise of a game machine and the whole family gets familiar with it. Then suddenly someone realizes that there is a built-in Basic or that he can easily add a word processor cartridge, disk drive, and printer, and we've got him. The computer is already in the home, which is the hard part.

AE: Do you think people are afraid of the keyboard?

JS: Not when it's a game playing keyboard. It doesn't matter if a keyboard is attached or not, they don't want to deal with something they think is a computer.

It's interesting to note that when the 2600 was introduced, it was considered the very first Video Computer System.

That was ten years ago, and that introduced a lot of kids to the concept of interacting with an electronic device. Look at the world today; computers are literally everywhere; kids are much more accepting of high-tech, and their parents are accepting it too.

Well, ten years ago a 2600 cost \$150. Today, there's a whole new generation of consumers, and they can buy an XE Game System—a sophisticated computer—for that same \$150. We're look-



"We are bringing out lots of new games for the XE Game System, and we are bringing back some of the classic games that people know and love."

ing forward to seeing what happens to this generation that is being introduced to the wonderful world of microprocessing via an XE Game System as opposed to a 2600. We think that's going to have quite an impact ten years from now.

AE: It seems that with XE computers on the one hand and the XE Game System on the other, Atari is going to have a huge installed base of users, all hungry for new software and other products. Do you think that will have an impact on development in the next few years?

JS: It's all a numbers game. When you combine the number of 8-bit computers already out there with the kind of numbers we're looking at for the XE Game System, you see a force that will be very difficult to ignore.

When the 400/800 first came out, most of the early development focused on games, followed by productivity and educational software. I believe that will also be the case with the XE Game System.

We are bringing out lots of new games for it, and we are bringing back some of the classic games that many people know and love, because there is a whole new generation out there that hasn't had the opportunity to play them. We think these new users deserve the opportunity to enjoy our old favorites, and we think the games themselves deserve to be re-introduced.

AE: Many of the older titles are being re-introduced on cartridge, correct?

JS: Absolutely. The size of cartridge programs is no longer limited to 16K,

now that we can make cartridges with up to a 256K of ROM. Look at *Flight Simulator II*, which we are packing with the Game System. It contains all the scenery—everything that is in the two-disk product that a computer owner buys—in a single ROM cartridge.

AE: I understand the XE is selling extremely well in countries where people are just now discovering computers. Is this true?

JS: Absolutely. And, since there are trade bans on certain chips, the XE can go places that machines like the ST can't as yet.

For instance, we have been selling huge numbers of XEs in Poland. They love the machine. It's in their school

systems; it's almost the official computer of Poland. [We're not surprised; we get more mail from Poland than any other country except the U.S.—Ed.]

People in Europe have less money to throw around than we do, so they shop carefully for the best value. It doesn't necessarily have to be the "latest thing."

AE: What new software titles will we see for the XE soon?

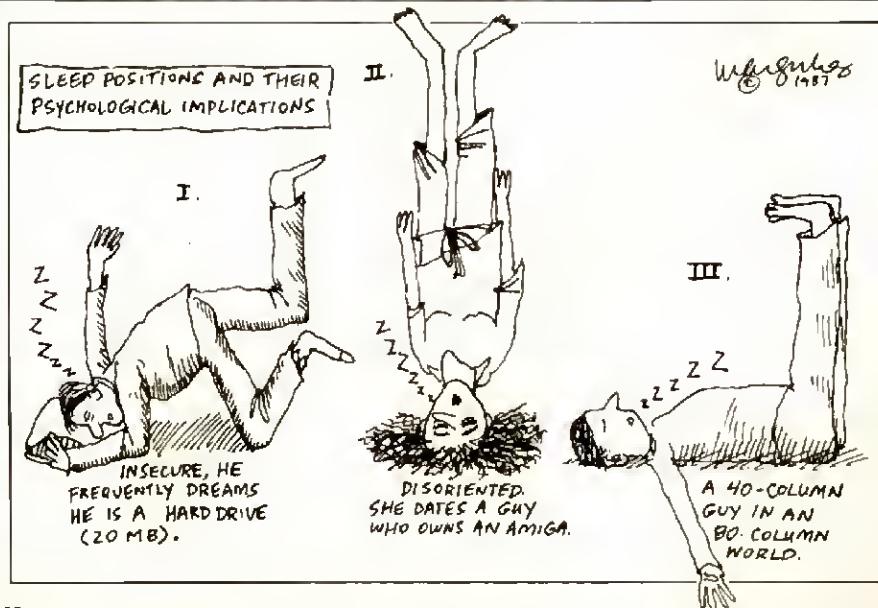
JS: A number of older disk-based products will be released on cartridge. *Star Raiders II*, *Blue Max*, *BallBlazer*, and *Rescue on Fractalus* are all examples of programs that are moving to cartridge. There will also be some titles that have never been available for the XE before, including *BattleZone* and *Food Fight*.

Of course, productivity products are coming too—*AtariWriter 80*, *Silent Butler 80*, *SX Express*, and *ADOS*. We are also looking at a lot of good things that are being done for the machine in Europe.

AE: What message would you like to pass along to *Explorer* readers?

JS: Are we doing nifty games? You bet. Is the XE Game System going to be successful? You bet. Is this going to mean new members for user groups when XE Game System owners want to learn about computing? You bet.

When we get a bunch of these out there, people will be writing software that both XE Game System and Atari 8-bit computer owners will be able to use. I think doing the XE Game System is an all-around good thing—especially in the U.S. ■



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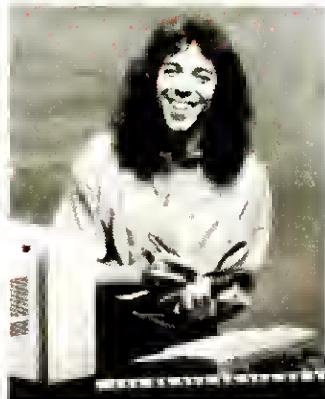
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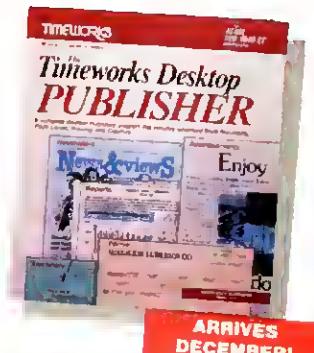
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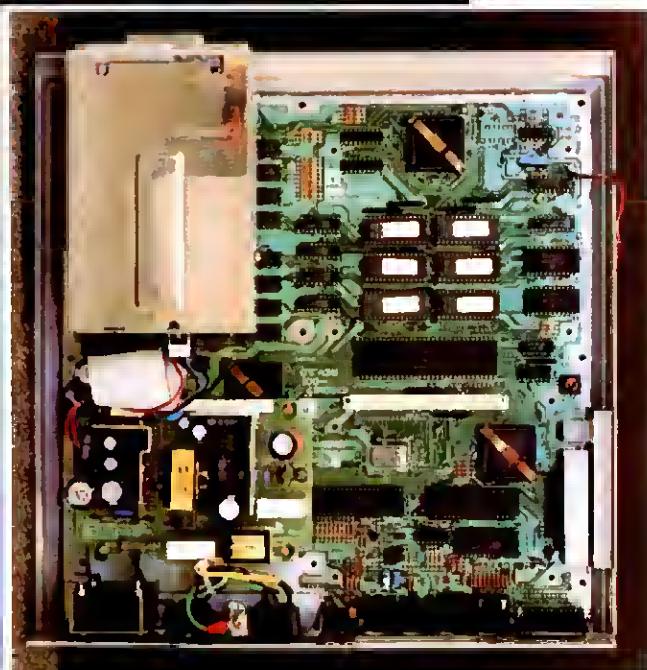
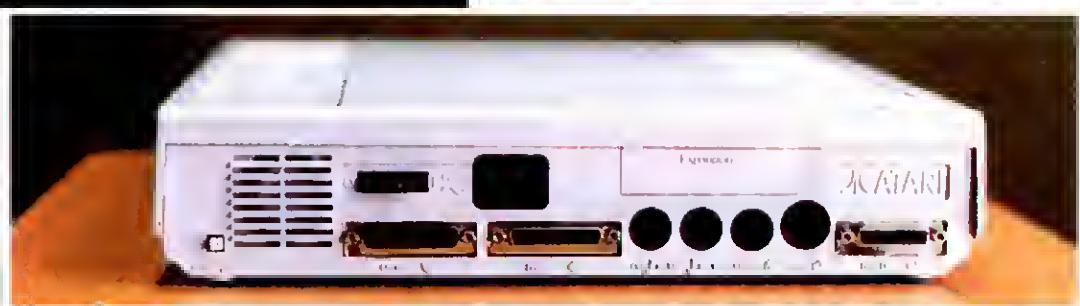
Ports: Parallel (printer), serial (modem), floppy disk, MIDI (music synthesizers, sequencers), monitor, cartridge, mouse, joystick, and DMA (hard disk, laser printer).

Price: 2Mb CPU with monitor, under \$2000; 4Mb CPU with monitor, under \$3000.

Summary: Friendly, powerful computer with a substantial base of existing software. Easy setup, with all ports built in. Comparatively inexpensive competitor for Macintosh and IBM and compatibles.



Mega ST



*A friendly computer with an abundance of memory
designed to provide a "total solution"
to your computing problems*

By MARK JANSEN

Early microcomputers were the domain of hobbyists, people who bought them more for their novelty than for their usefulness. People who lined up to buy kits, solder them together, and cheer when they flickered to life, blinking tiny LEDs or uttering clicks through an external speaker.

Today's computer buyers are much more difficult to impress. They view the computer as a tool, and they want that tool to be powerful, affordable, and easy to use. Novelty doesn't impress them the way it did those early hobbyists; today's computer buyers are interested mainly in increasing their productivity. They have seen machines that are powerful but require a month of training to use and machines that are friendly but limited; until now, few machines have been friendly, powerful, *and* affordable. The Atari Mega ST is just such a machine.

Basically, the Mega is an enhanced version of the ST with two or four megabytes of memory and separate housings for the keyboard and CPU. Let's have a look at it from the user's perspective.

The first hurdle facing a computer

PRODUCT REVIEW

user is setting the machine up. After unpacking the Mega, which consists of a detached keyboard and CPU, I spent less than five minutes getting it set up.

The Mega CPU is much smaller than the typical IBM-ish computer, being about a foot square and 3" high. The styling is sleek and clean.

The monitor (color or monochrome) is separate and sits on top of the CPU, with one cable running to the monitor output jack on the computer and another to the wall. The mouse plugs into the keyboard, the keyboard plugs into the CPU, and one power cord connects the Mega to the wall outlet. The only other setup step involves the installation of two AA batteries, for the real-time clock, in a compartment on top of the CPU.

Peripherals, including an external 3½" floppy disk drive (the same SF314 or SF354 used with the ST) or an external hard disk drive are just as easy to attach. None of the connectors can be plugged in upside down or into the wrong jack, so there is little chance of getting confused and none of damaging the hardware. The Mega ST manual provides clear instructions and helpful diagrams.

Once you have the system assembled, all you have to do to bring the machine to life is insert a disk in the built-in double-sided, double-density, 720K disk drive and turn the monitor and computer on. TOS, the operating system, is already onboard in the form of six ROM chips, so you don't have to load it each time you turn the machine on. Soon after the power starts flowing, the Mega "desktop" appears.

From then on, the Mega provides a visual metaphor for computer operations. Disk drives are represented as file drawers, which can contain folders, which can, in turn, contain other folders or individual files and/or programs.

You use the mouse to move an on-screen pointer, which facilitates point-and-click configuration of the system and execution of programs. Very little setup is needed to use the system, but you can, if you want, customize the desktop to suit your specific needs. The colors can be changed, the icons can be rearranged, and the desktop can be set to display the contents of a specific disk or folder each time you boot the system.

It is fairly easy to learn your way around the Mega without studying the manual, just by clicking on things and watching the results. Double-click on a floppy disk icon, for example, and the icon opens, displaying the contents of the disk. Click on a program icon, and

the program runs. Click on a text file, and the Mega asks if you wish to show it on the screen, print it on your printer, or change your mind altogether.

(An aside about printers: If you have an Epson graphics compatible printer, two keystrokes will dump whatever is onscreen to paper. Again, the manual explains even the very basics of the operation, including where to point and when to click.)

Software

For all its friendly technology, the Mega can do little without software. Fortunately for users, the Mega comes

It is fairly easy to learn your way around the Mega just by clicking on things and watching what happens.

out of the gate with a large selection of programs developed by companies like Atari, Microsoft, and Word Perfect.

The Atari ST series predates the Mega by about two years, and that time has not been wasted by software companies, who have been busy developing everything from word processors to paint programs to spreadsheets for it. This same body of software runs flawlessly on the Mega—often with better results.

There are two reasons for this enhanced performance: an improved version of the operating system and a new custom chip, the Blitter. The new TOS has had some time-critical portions optimized for better performance and has been made even more capable than its predecessor. Support has also been added for the Blitter, which moves data around in memory very quickly.

These improvements combine to increase the speed of the graphics around which the user interface of the Mega is built. The machine draws and redraws objects onscreen more rapidly; icons and windows, the portholes through which a program communicates with the user, open, close, and display their contents much more quickly than they do on the ST.

This increase in speed is good for a lot more than just showing off. Scrolling through a window in a word processor, for example, is much smoother and faster than in the past. And data on disks formatted by the Mega can be accessed faster thanks to a new "skewed" format, which places sectors on subsequent tracks in a position that gives the head time to align itself before the first sector comes around. My informal benchmark showed that the Mega disk loaded a large program about 30% faster than a disk formatted on a standard ST.

In addition to the software written for the ST that runs on the Mega, several "emulators," programs that coax the Mega to run software intended for other computers, have been developed by third party vendors. Avant Garde sells an MS-DOS emulator, called *PC-Ditto* (see review elsewhere in this issue), that allows you to run a very large portion of the existing library of software written for the IBM Personal Computer and compatibles.

Data Pacific sells a cartridge called the Magic Sac (see review on page 42 of the Jan/Feb 1987 issue) which persuades the Mega to run software designed for the Apple Macintosh family of computers.

Between these commercial programs and a public domain CP/M emulator, it is fair to say the Mega can run literally thousands of programs—many for very specialized purposes.

Under the Hood

The heart of the Mega system is a Motorola M68000 microprocessor running at 8 MHz. This is the same chip used in the Apple Macintosh series and is generally considered more powerful than the 8088 used by PCs and their clones.

Unlike the Macintosh, however, the Mega makes use of several Atari-exclusive custom chips to assist the 68000. These include the Shifter, which is responsible for graphics; MMU and Glue, which control system memory and generally "hold the machine together"; DMA, which provides high-speed input/output for floppy and hard disks and special gadgets like the Atari Laser Printer; and the Blitter, which handles high-speed data manipulation in memory, resulting in faster graphics and other data-movement-intensive activities.

The Mega also offers a new expansion bus, an extension of the system bus through which hardware designers can communicate with all manner of expansion cards that will allow users to take advantage of the speed of the Mega in

anything from networking to number-crunching.

Atari has shown a math coprocessor card for the bus connector, which could be used by math-intensive software to relieve the 68000 of the burden of performing complicated mathematical operations. As is the case with math coprocessors designed for other computers, software must be written specifically to take advantage of the math coprocessor.

While Atari may not offer a coprocessor card itself, several other companies have shown strong interest in the expansion potential it and other cards offer, so look for new applications that will enhance the power of the Mega and keep it current for years to come.

Memory Capacity

Because the expansion connector permits access to the main system bus, where the processors communicate with memory, it is possible to add extra RAM to the expansion bus. The Motorola 68000 has a maximum address range of 16Mb, so it could conceivably communicate with that much extended memory.

An interesting application of such an enormous memory capacity might be a large, battery-backed RAM card that the Mega would recognize as a blazingly fast disk drive. The extra RAM can also be used in applications like sound digitizing where a large amount of very fast temporary storage is invaluable.

At the moment, it is difficult to imagine an application that would require more than 4Mb RAM, but given that only a few short years ago 32K was considered excessive, I'm sure that software engineers will find a use for every bit of the Mega memory—and more.

The Mega comes in two- and four-megabyte models, which are essentially identical except for memory size. Most of the enormous memory is available to the user, with only about 150K set aside for the operating system. Most (192K) of the operating system, including TOS, GEM (Graphics Environment Manager), and BIOS (Advanced Basic Input/Output System), is in ROM.

The size of the memory is a tremendous advantage. Existing programs, like word processors and databases, take immediate advantage of it by allowing larger documents and indexes. Large RAMdisks, which use memory to simulate very fast disk drives, can easily be used to speed up disk-intensive programs. And, the door is open for larger, more sophisticated applications yet to come.

The *Flash* telecommunications program, for example, benefits from the extra memory by providing a much larger capture area. I recently spent more than two hours on Genie with the Mega, capturing in memory everything in sight, and at the end of that time, *Flash* reported that my memory was just 11% full.

Expansion Ports

The rear of the Mega is packed with expansion ports. These include a parallel port for connecting standard printers, an RS-232 serial port for modems and other serial devices, a DMA port

mail, and online through several telecommunications services. Everything from information on the nearest authorized dealer to software suggestions to programming help is available to users who call, write, or connect.

Telecommunications is becoming an important part of customer service for Atari. The company, through its employees, is a major online presence, and user response to this line of communication has been excellent. With the advent of electronic mail and low-cost telecommunications services like Genie, far more questions can be handled in less time online. Another advantage is that

The Mega is designed for the consumer who is looking for a total solution to his computing problems.

for extremely high-speed I/O, a MIDI port to control music synthesizers, a floppy disk port for connecting an external 3½" drive, a monitor port, and a cartridge port. A removable panel labelled Expansion, provides access to the system bus connector inside.

Joystick and mouse ports are provided at the back of the detached keyboard. The keyboard layout is identical to that of the ST, but the keystroke mechanism has been improved. The keyboard "feels" better, offering a more definite click when a key hits bottom. As a touch typist, I found the change very noticeable and quite comfortable.

Service

We have covered the obvious ways in which the Mega is superior to its predecessor; one that is not so obvious is support. Although the Mega is a computer that approaches the status of "information appliance," Atari feels it is, nevertheless, an appliance that needs more support than most department stores are capable of providing.

Consequently, the Mega will be sold only through Atari-authorized, full-service dealers, who must be provide personnel to answer buyers' questions about the machine and to service it in the event of a problem. Mail order houses will not be authorized to sell the Mega.

Atari Corp. is available to its customers through several channels; phone,

these services are available 24 hours a day, seven days a week, so users can send and receive questions and information whenever convenient.

Moreover, users can address a far larger group of people online than through individual contacts by mail or over the phone. In addition to Atari personnel, other users and representatives of third party companies, who may have additional knowledge about specific subjects, are available to answer users' questions.

As all current Atari users know, Atari is well-known for its philosophy of Power Without the Price. In keeping with that philosophy, the Mega is designed for the consumer who is looking for a total solution to his computing problems, and backed by a network of full-service dealers and Atari Corporation, the new machine should have no trouble delivering just that.

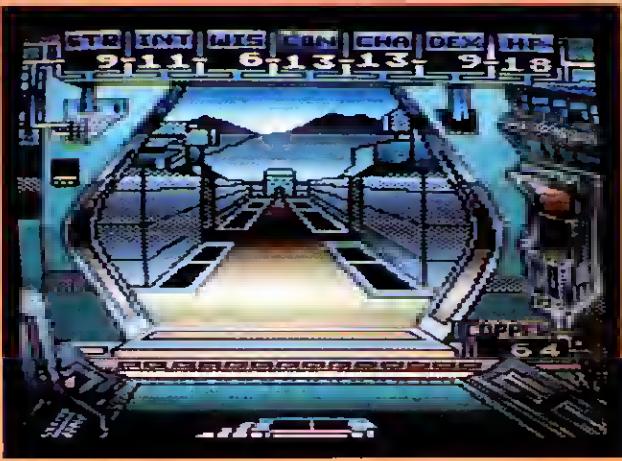
The Mega ST is easy to use, boasts access to a large and growing library of software, and costs considerably less than similarly configured machines from competitive manufacturers.

Although exact pricing was not available at press time, the price for a 2Mb system with color or monochrome monitor will be under \$2000, and the price for a 4Mb system, under \$3000.

With the advent of the Mega ST, it appears that Power Without the Price is moving upscale with an admirable alternative to the IBM and Macintosh. ■



Ultima IV



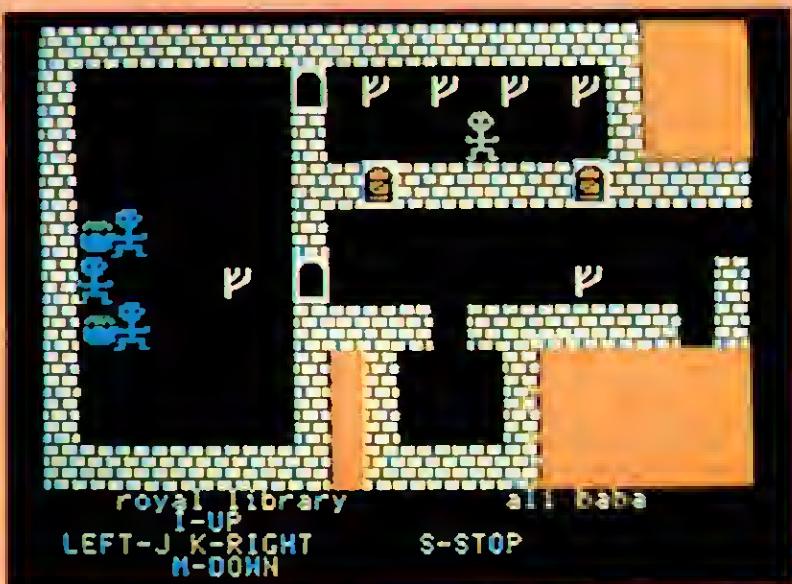
Alternate Reality: The City



Murder on the Zinderneuf



Interactivity is what distinguishes a novel from an adventure game.



Age of Adventure

A Handbook for Computer Adventurers

A guide to adventure games

for Atari 8-bit systems

Roots: Up from the Dungeon

Retelling stories and legends has always been a popular pastime, but it wasn't until the early 1970s that anyone thought to create rules for this folk art. It was about then that E. Gary Gygax and David Arneson took a set of rules for medieval combat with miniatures, added a heavy fantasy component, and developed a complex system of charts and tables to deal with aspects of the campaign other than the clash of whole armies.

The game they created (whose name we won't mention in order to save their lawyers the trouble of writing us a nasty letter) has set the pattern for all role-playing games (RPGs), electronic and otherwise. Players generate characters who gain power as a result of their exploits in the game world. Parties of characters combine their various abilities to achieve mutually beneficial goals, which range from routing evil cults to rescuing damsels in distress.

The keystone of any non-electronic RPG is the Dungeon Master (DM). Besides refereeing the actual play of the game in a more-or-less impartial manner, the Dungeon Master designs the imaginary world in which all the excitement takes place. Players declare what each character wants to do during any given turn, and the DM reports the consequences of their actions.

This intriguing format has sold millions of copies of non-electronic RPGs, but it also implies a disturbing paradox, which has caused interest in the games to wane. The troll under this bridge is that the Dungeon Master, the person in the group who is apt to have the most consuming interest in the game, never actively participates. When the stalwart

Ever slay a dragon? Unless you are one of the fortunate few with access to a functioning time machine, your answer is probably "No." It is also likely that few *Atari Explorer* readers have tracked down a murderer, rescued a princess, or saved the known universe from annihilation.

What's more, few of us will even get to do these exciting things in the future—at least not in "real" life. Fortunately for the adventurous among us, there is also electronic life, and the Atari 8-bit system is a doorway to exploits as heroic and grand as any in literature, film, or television. Adventure games invite computerists to enjoy a wide range of vicarious experiences without any risk to pride or person.

What Is an Adventure

Role-playing and interaction are the hallmarks of the computer adventure game, and they exist, in varying degrees, in all adventures.

In general, you, the gamer, assume one of two types of role in an adventure. You either become a specific character in a story or create a protagonist within statistical parameters established by the program.

Interactivity is what distinguishes a novel from an adventure game. The plot of a novel is an unbreakable, linear chain of events. No matter how quickly or slowly you turn the pages and scan the words, the story always runs on the same track—without embellishment or deviation.

In contrast, a computer adventure puts you in the middle of a world created by the program author. Your character can then move among the locations, examine items, talk to other characters, and so forth. In a sense, an adventure is like a novel in which the game designer and the player join forces to tell the story.

band of heroes attacks the fire demon on the enchanted mountaintop, the DM is stuck juggling the charts and random number generator on the sidelines.

Another problem with non-electronic adventures, from the DM's point of view, is that it takes a lot longer to create a scenario than it does to play it out. A DM might spend a week working on an episode that four players then demolish in a couple of hours. Most adults don't have time to concoct enough scenarios to make more than occasional play practical.

Prepared modules ease the Dungeon Master's creative burden, but it still requires hours of study and fine-tuning to make a "canned" scenario fit smoothly into an ongoing RPG campaign.

Computer adventures transfer the duties of the Dungeon Master to the machine. While no computer can compare with a skilled human Dungeon Master, adventure software requires little or no preparation time and provides an outlet for the suppressed heroic urges of frustrated DMs.

Early Electronic Efforts

By the mid-1970s, mainframe users were playing Original Adventure and Colossal Cave. Memory and graphics limitations kept these all-text games simple. The player typed simple commands to move the character from location to location. The program described the locations, creating as it went a logical puzzle. The player solved the puzzle, generally by picking up and using appropriate items, and then advanced to the next testing area. Some programs rewarded the gamer with a treasure for each puzzle solved.

Scott Adams brought puzzle dungeons to the home in the late 1970s with a series of adventure games that eventually formed the basis of his company, Adventure International. His games,

By ARNIE KATZ and BILL KUNKEL

though ingenious for their day, suffered from a primitive parser and the minuscule memory of systems like the TRS-80 Model I and Commodore Pet.

Ken and Roberta Williams's *Mystery Funhouse* added pictures to the prose to create the first illustrated adventure in 1981. Each location in this detective story provided a drawing that resembled a page from a completed coloring book and a line of text describing the details.

Wizardry and *Ultima I*, both published for the Apple II in 1981, reduced the drudgery of typing orders by substituting a single-keystroke command system. *Wizardry* also introduced such RPG elements as character class and experience levels to computer adventuring.

The first true graphic adventure was *Temple of Apshai* from Epyx, which is still available today. (Epyx repackaged *Temple of Apshai* and its two sequels as *Apshai Trilogy* in 1986. A cartridge, *Gateway to Apshai*, is no longer in active distribution but may be available at discount outlets and garage sales.)

The player uses the joystick to move the character around in a multi-level dungeon, which is viewed from above. The fire button activates any weapon or other device he may be carrying. More recent graphic adventures have introduced full-screen animation and pseudo-three-dimensional perspective, but it all began with the treasure hunting and monster fighting of *Apshai*.

The big difference between illustrated adventures and graphic adventures is that in the latter your character interacts directly with the picture on the

screen. In the former, the character is clearly outside the drawings the computer paints.

Designers continue to refine these game systems and combine them in innovative ways to produce sophisticated hybrid formats. The introduction of higher-memory micros like the Atari ST also benefits 8-bit users indirectly: translating games from the 16-bit systems has resulted in advances in 8-bit programming techniques. Within the next 12 months, this new knowledge will bring Atari owners even more satisfying and detailed adventures.

The Realms of Computer Adventuring

Many of the older adventure games are still available for Atari 8-bit systems, and many companies, including Infocom, Datasoft, and Strategic Simulations continue to release new titles on a regular basis.

True to the roots of the genre, the most popular theme for computer adventures remains fantasy. Other subjects have gained in popularity, particularly in the last year or so, but tales of magic and legend still dominate.

The best text adventures come from Infocom. The sophisticated parser created by the company's designers elevated the crude puzzle dungeon to the level of true interactive fiction. The parser analyzes the player's words and determines the appropriate response. The larger the vocabulary, the less like a word-guessing contest the adventure will seem.

★ Novice heroes and heroines may want to start with *The Zork Trilogy* from Infocom, an omnibus volume sub-

suming all three of the fantasy quests set in a mythical underground empire. Clever puzzles, meaty descriptions, and a dash of off-center humor make these search and destroy missions as enjoyable today as when they were first published.

★ After mastering *Zork*, you may want to trade your warrior's sword for a wizard's robe in Infocom's *Enchanter Trilogy*, which consists of three separate titles—*Enchanter*, *Sorcerer*, and *Spellbreaker*. You begin your quest to rescue your magical mentor as a mere apprentice and rise to assume the leadership of the Circle of Enchancers by the time the third part of the trilogy reaches its climax.

★ Another real treat for fantasy fans is the *Ultima* series from Origin Systems. Writer/designer Lord British has authored four increasingly awe-inspiring fantasy epics, each of which features a vast and highly detailed world that serves as a backdrop for fighting, trading, puzzle-solving, and other adventurous activities. The graphics, which have improved enormously with each title issued since *Ultima I*, feature full-color, multi-screen maps for strategic movement, overhead views of towns, and a first-person perspective in the labyrinthine underground dungeons.

The story lines in the *Ultima* series can't be summed up easily in a single sentence. Your goal in *Ultima IV*, for example, is to attain enlightenment and self-realization—pretty heavy stuff for a floppy disk.

Origin Systems has *Ultima I, III*, and *IV* in print at present, and the company has promised to reissue *Ultima II* in a new Atari 8-bit version in the very near future.

★ The electronic hero must purge an entire continent of evil in *Questron* from Strategic Simulations. This solitaire adventure is a must for those who can't get enough of the *Ultima* series. Although the plot is not nearly as inventive, the play of *Questron* will remind you of *Ultima III*. Designer Charles Dougherty has even improved Lord British's control scheme in one major respect: you select commands from an on-screen menu with the joystick, which is much simpler than entering them with keystroke codes.

★ Electronic Arts has repackaged two classic Stuart Smith titles first issued under the Quality Software banner as *Age of Adventure*. *Ali Baba* and *Return of Heracles* provide a refreshing change from the usual run of medieval fantasies. The artwork is a little clunky



Where to Find Adventure

Datasoft/Intellicreations
19808 Nordhoff Pl.
Chatsworth, CA 91311
(818) 886-5922

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
(415) 571-7171
(800) 245-4525
(800) 562-1112 in CA

Epyx
600 Galveston Dr.
Redwood City, CA 94063
(415) 366-0606

Infocom
125 Cambridge Park Dr.
Cambridge, MA 02140
(617) 492-6000
(800) 262-6868

Origin Systems
340 Harvey Rd.
Manchester, NH 03103
(603) 644-3360

Strategic Simulations
1046 N. Rengstorff Ave.
Mountain View, CA 94043
(415) 964-1353

by today's standards, but Smith's uncanny ability to use art, audio, and even customized text character sets to evoke the appropriate mood transcends any such minor deficiencies.

★ Reminiscent of *Ultima* and *Questron* is *Phantasie* by Doug Wood for Strategic Simulations. The graphics and overall presentation of *Phantasie* are similar to those of its predecessors, but *Phantasie* allows you to control an entire party of adventurers, each with unique abilities, rather than a single character. SSI has already released two sequels for other computers, each a significant improvement over the original, and both are likely to join the Atari 8-bit library soon.

★ *Alternate Reality: The City* from Datasoft is a science-fantasy RPG which should appeal strongly to those who want to create characters and help them gain experience and concomitant power by surviving encounters with the denizens of a strange metropolis.

Outstanding first-person perspective graphics and a stunning soundtrack make this finely detailed city exciting and challenging to explore. There are shops to browse, monsters to fight, and treasures to gather. Datasoft has announced the imminent release of *Alternate Reality: The Dungeon*, a sequel to the original game, which should be in stores by the time you read this article.

★ The best bets for mystery fans who want text adventures are Infocom's *Deadline*, *Witness*, and *Suspect*. In each case, the object is to unravel a complex murder plot in a limited amount of time. Multi-pathed plots and excellent characterization are the hallmarks of this outstanding series of interactive detective stories.

★ *Murder on the Zinderneuf* from Electronic Arts is a graphic mystery adventure set on a trans-Atlantic Zeppelin flight. It asks you to assume the

identity of one of several famous detectives and attempt to catch a killer before the airship docks in Lakehurst, NJ.

Role-playing is a key aspect of *Murder on the Zinderneuf*. There are many ways to question suspects, and you must carefully match the style of the investigation to the personality of the suspect for best results. Because a different person is guilty each time, *Murder on the Zinderneuf* gets high marks for replayability.

lization as we know it goes down the tubes.

★ *Trinity*, also from Infocom, deals with the detonation of the first atomic bomb and the threat of nuclear war. It whiskers you from the mundane paths of a London park to the farthest reaches of space and time.

★ Amy Briggs's *Plundered Hearts* is a good example of the current trend toward finding fresh themes for computer adventures. "Save the princess"

Scott Adams brought puzzle dungeons to the home in the late 1970s with a series of adventure games that formed the basis of his company, Adventure International.

★ The lighter side of science fiction is represented by several other Infocom titles. Doug Adams captures the unpredictable prose style and wild humor of *The Hitchhiker's Guide to the Galaxy* in the Infocom text adventure of the same name. The plot of this game is too linear for our taste, and it requires that you learn to approximate the thought processes of the eccentric author to negotiate the twists and turns of the plot successfully, but it is a highly entertaining experience nevertheless. More "mature" adventure enthusiasts will also enjoy the slightly risqué space opera, *Leather Goddesses of Phobos*. Floyd the friendly robot aids the player, while providing comic relief, in *Planetfall* and *Stationfall*.

★ In contrast, *Suspended* is serious science fiction built on the thought-provoking premise that the protagonist is the human component of a huge computer. You must discover what has gone wrong with society and fix it before civi-

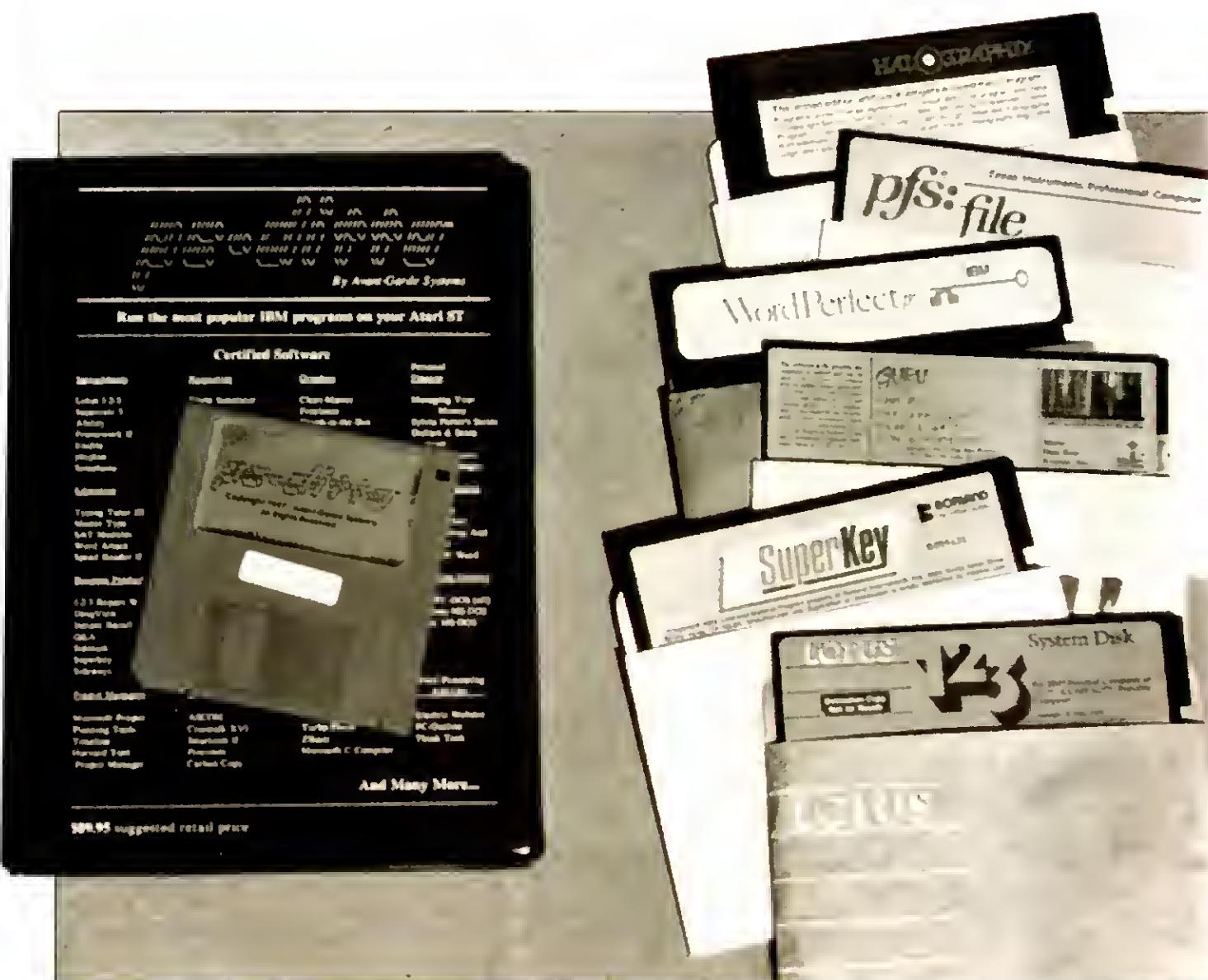
yarns seem to have been replaced by more erotic settings and story lines. This text adventure, for example, casts the computerist as an innocent azure-eyed lass imperiled by all the dastardly evils at work on the high seas in the 17th Century. Romance and danger are mixed in equal arts in this trend-setting escapade.

Coming Attractions

An informal survey of software publishers shows renewed interest in producing adventures for Atari 8-bit systems. And we think it likely that many new games will debut in this format before next summer.

But you don't have to wait to get started on your adventuring career, because the cupboard is far from bare. So boot an adventure disk and open the door to vicarious experience in parts unknown. It's the best way we know to have the thrill of a lifetime and still be home in time for dinner. ■

PRODUCT REVIEW



PC-Ditto

*Avant-Garde Systems introduces
an amazing new product that will
make your ST act like an IBM PC*

PC-Ditto

System: Atari ST (color)

Price: \$89.95

Summary: IBM PC emulator for ST with all PC features including color graphics, I/O ports, hard and floppy disk drives, printer support, and sound.

Manufacturer:

Avant-Garde Systems
381 Pablo Point Dr.
Jacksonville, FL 32225
(904) 221-2904

By David H. Ahl

Like oil and water, the Atari world and the IBM world exist between and around each other, but they don't really mix. While it has been possible to pass data files back and forth between brands, programs have been an entirely different matter. A program written under PC-DOS or MS-DOS for an Intel 808x microprocessor just plain won't run on a Motorola 68000 chip. Until now, that is.

Bill Teal, a former IBM research fellow, has spent 18 years, many of which were devoted to writing emulators, in the computer industry. Engage Bill in conversation, and he will tell you of the tribulations of making a Burroughs mainframe pretend it is an IBM 370 or of file structure incompatibilities between IBM and DEC computers. Compared to problems like these, getting an Atari ST to behave like an IBM PC is almost easy, says Bill. It is just a matter of working out some details—a few hundred thousand of them—all of which are interrelated and any of which can cause the program to fail.

When I first got *PC-Ditto*, I was convinced that one of these details remained unresolved when PC-DOS just wouldn't load, but a phone call to Bill soon set me straight. Now, after many hours of beating on *PC-Ditto*, I have found that it works as advertised—that is, it runs virtually any non-game IBM PC program speedily and flawlessly.

For those readers who like to know the bottom line at the beginning, let me say that *PC-Ditto* is one of the most useful programs I have ever seen, and for \$89.95 it is an absolute steal. It is definitely, as a leading consumer magazine would say, "A Best Buy." I'm impressed.

What is *PC-Ditto*?

There are several ways to get software designed for one computer to run on a different one. The simplest way is to plug into the host computer an entire circuit board containing the same type of mpu as the target computer. For example, Quadram makes a board that plugs into an IBM PC and allows it to run Apple II software. Only the keyboard, display, disk drive, and I/O circuitry of the IBM PC are used; everything else is on the new plug-in board.

Another approach is taken by Data Pacific which makes a hardware/software package for the Atari ST that al-

lows it to run Macintosh software. The Magic Sac, as this emulator is called, uses the ST mpu, because it is the same 68000 used by the Mac.

The main disadvantage of both of these methods is that they are rather costly because they duplicate hardware that is already in the host computer.

PC-Ditto uses an all-software approach which takes every single Intel 808x instruction and converts it at the microprogramming level to one or more 68000 instructions. This is known as a software emulator. The main disadvantage of this type of emulation is that some of the target computer instructions may require more than one instruction in the host computer, thus making it slower in execution speed. For the most part, *PC-Ditto* runs programs at about 60% to 75% of the speed of a standard 4.77 MHz IBM PC and about 30% to 45% of the speed of a so-called "turbo" machine with an 8 MHz clock speed.

In a practical sense, this means that *PC-Ditto* is more suitable for running spreadsheets, database programs, and other "business" software than it is for running arcade-type games or programs with realtime functions.

PC-Ditto runs on both the 1040ST and the 520ST. As might be expected, the program is fairly sizable—about 150K—but even so it allows ample room for most IBM PC programs and data. On the 520ST, you have 364K available, while on the 1040ST, you have 703K—63K more(!) than on a fully-expanded 640K IBM PC or compatible.

PC-Ditto will imitate either a monochrome system or one with a color graphics adapter installed, although, curiously, it requires an Atari color monitor to do either. According to Teal, there is an incompatibility of some sort in the Atari monochrome monitor that just can't be overcome by *PC-Ditto*.

The standard IBM parallel printer port and RS-232 serial port are fully supported. Because of the speed difference, we wondered whether baud rates at the serial port would be correct. As far as we could determine, they are okay, although we only tried it at speeds up to 300 baud.

PC-Ditto supports both 3½" 80-track and 5¼" 40-track floppy disk formats. We used the 1.B. 5¼" drive and found it most satisfactory. While you

Software certified to run under *PC-Ditto*.

1. Spreadsheets/Integrated Packages

Ability
Enable
Express Calc
Framework
Framework II
Javelin
KnowledgeMan/2
Lotus 123
Multiplan
PFS: Professional Plan
PC-Calc
Supercalc 3
Supercalc 4
Symphony
The Smart Software System

2. Recreation

3-Demon
ABM
Backtalk
Battlezone
Blackjack
Buck Rogers
Castle
Cyclops
Dragon World
FlightMare
Hobbit
Infidel
Island of Mystery
Jet
Jump Joe
Microsoft Flight Simulator
Mind
Monopoly
Musician
NFL Challenge
Novatron
PC-Golf
PCChess
Piano Man
Planet Fall
Pool
Serpentine
Spacewar
Starflight
Startrek
Striker
The Witness
Trekrun
Zork I, II, and III

3. Graphics

Art Studio
Atias Mapping Software
Chart Master
Charts Unlimited
Cheap CAD
DDCAD
Dan Bricklin's Demo Program
Draw!
EasyCAD
EasyFlow
Executive Picture Show
Freelance
GRASP
Graph-in-the-Box
Graphassembler
HyperGraphics
Lady Bug Graphics
Map Builder
Microsoft Chart
PC Storyboard
PC-Draft
PC-Key-Draw

PRODUCT REVIEW

Software certified to run under PC-Ditto (cont'd.)

Pereonal Computer Picture Graphics
Present Slide Presentation System
ProDesign II
Slide Write Plus
The Grafix Partner
VCN Concorde
World

4. Personal/Home Finance

Chese Spectrum
Dollars & Sense
Finance Meneger
Inveest
Loanpak
Maneging Your Margin
Money
Options
PC-Check
PC-Stock
Swift Tax
Sylvia Porter's Inveatment Manager
Sylvie Porter's Pereonel Financial
Series
The Evelyn Wood Dynamic Reader

5 Project Managers

Harvard Total Project Manager
Job Scheduler
Microsoft Project
Planning Tools
PC-Kibol
ProTracs
SuperProject
Timeline

6 Word Processing - Addres

Electric Webeter
Exact
PC-Outline
Resident Speller
Think Tank
Webeter's New World Spelling
Checker
Whoopie

7. Business Productivity

1-2-3 Report Writer
Bottomline
1-2-3 Report Writer
Bottomline V
DeteLew/PC
DataLaw/Mgr
Datamate
DesqView
Doeamatic
Exsell
Flashcode
FormTool
GEM
Holmes
Inset
Inetant Recall
IT Figures
Keep Track
Keynotes
LETTRIX
Merkie Marketing
Metro
MonoGrafX
Multiple Choice
Org
PC Window
PC-Deek II
PC-DeskMetee
PC-Menu
PC-Tracker

can run *PC-Ditto* with two 3½" drives, I would strongly recommend having one 5¼" drive, because so much IBM software is available in that format. If you do run with two 3½" drives, at least one of them should be double-sided.

Using PC-Ditto

Starting the system can be a bit confusing for a novice user, particularly one who is not familiar with MS-DOS conventions. The system can be booted directly from the *PC-Ditto* disk or from a hard disk. If you are using anything but an absolutely plain vanilla configuration, the boot programs and *PC-Ditto* itself must be in the root directory rather than in a folder as it is furnished on the distribution disk.

This, incidentally, was the problem I had in getting MS-DOS to boot. The system kept insisting that CONFIG.SYS and the command interpreter, two programs on the MS-DOS disk, were bad or missing—they weren't—because it had failed to read the altered *PC-Ditto* configuration program.

Where things get confusing is at the time you switch from the 3½" drive A, from which *PC-Ditto* is booted to drive A, usually a different physical drive, from which the MS-DOS software is booted. The startup screen tells you that drive B is the "internal" drive (it is essentially saying that this is now drive A) and directs you to put your MS-DOS

drives and he'll want the data disk in drive B." As a result I had no choice but to transfer the data from one format to the other.

Actually, you can get around this problem at startup time by specifying to *PC-Ditto* that you have only one drive, but this is unsatisfactory if you want to run other software that requires two drives in the same session.

Formatting and copying disks from 5 1/4" media to 3 1/2" media creates another problem. While the IBM and ST formats are *almost* compatible, in this case "almost" translates to "not." You can format disks with GEMDO\$S, and everything will seem to proceed normally, but the disks will not read under MS-DOS.

PC-Ditto provides two solutions for this problem. You can either use the furnished device driver, PC-DDRVR.SYS, to read and write your GEMDOS disks under MS-DOS or you can format and copy disks using the utility programs on your MS-DOS disk. Once a disk has been formatted by MS-DOS, you can read and write data on it with either MS-DOS (ST or IBM machine) or GEMDOS.

Complicating Matters

Dealing with floppy disks is no picnic; nor is using a hard disk with *PC-Ditto* as straightforward as you might like. At the moment, *PC-Ditto* supports only

To turn an Atari ST into an IBM PC with the addition of a \$269 disk drive and an \$89 software package is an amazing accomplishment.

disk in drive A (meaning physical drive B). From then on, physical drive B is logical drive A and physical drive A is logical drive B. Got that?

This can become even more complicated with "smart" IBM PC software packages that automatically look at what is hooked up to the system and expect that you will use it. For example, I ran *Headliner* and wanted to use it as though I had a single floppy disk system, because I didn't want to transfer the massive data files from the furnished 5 $\frac{1}{4}$ " disks to 3 $\frac{1}{2}$ " disks. But the program looked at my system and said to itself, "aha, he has two floppy disk

one physical hard disk drive. While that drive may be partitioned (as is required on the ST), *PC-Ditto/MS-DOS* can access only one partition of at least 4.2Mb at a time. Also, to use a hard disk, you must have MS-DOS version 3.0 or higher.

Many other rules apply to the use of hard disks, but they, along with a score of other concerns, are discussed quite thoroughly in a README file that comes on the *PC-Ditto* disk. This eight-page file will be your Bible as you become acquainted with *PC-Ditto*.

There is also a 14-page manual, of which only seven pages contain prag-

matic information, mostly about setting up your system and getting started the first time. Obviously, the manual assumes that you either know MS-DOS or will learn about it elsewhere.

Compatibility

Perhaps a word about MS-DOS is in order. To the user, PC-DOS and MS-DOS are the same, but there are subtle internal differences in the way different versions interact with the host computer. *PC-Ditto* is designed to work with true PC-DOS—the operating system intended for use on an IBM PC or XT computer. The version of MS-DOS you have and its level of compatibility with PC-DOS will determine whether or not it will work with *PC-Ditto*.

We can state with certainty that PC-DOS versions 1.0, 1.1, 2.0, 2.1, 3.0, and 3.1 work fine and that no version of MS-DOS for the TI Pro works at all. As for the many versions in between, you are on your own.

Bill Teal has tried an impressive range of software packages on *PC-Dit-*

to, and he furnishes a partial list of 300 some packages which he certifies will run. They include spreadsheets, word processors, database managers, utilities, personal/home finance packages, languages, communications packages, business productivity packages, and games.

We tried a dozen or so packages, including *Lotus 1-2-3*, *Word Perfect*, *MultiMate*, *Sidekick*, *Norton Utilities*, and *Championship Baseball*, and had no trouble. Where we did run into trouble was with protected games that bypass DOS, booting only from a cold start. For example, we could *not* run any of the newest games from Activision, Accolade, Electronic Arts, or Mindscape. Nor could we run disks in the IBM Scientific Reasoning Series, which also boot independent of DOS.

Nor will IBM BasicA run on *PC-Ditto*. BasicA, interacts directly with the BIOS (Basic Input Output System) and requires genuine IBM PC ROMs, so it will not now—or ever—run under any emulator. Other versions of Micro-

Software certified to run under PC-Ditto (cont'd.)

- People Planner
Printworks
Q&A
Q-DOS
Qwickeys
Reports Plus
Salemaker
Sales Repeater
SB Assistant
Sidekick
Sideways
Smart Notes
Superkey
The Newsroom
Whats Best!
WindowDOS
X-Y-Z: Consolidate
X-Y-Z: Query
X-Y-Z: Spread

8. Utilities

- ldir
Arc
Alter
Back-it
Beep
C-Format
DGS-Edit
DMS (Disk Management System)
Diags
Dismod

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Capetronics 1200.....\$107.50	Color (RGB) System.....\$688	US Doubler (14...).....\$29.97
Capetronics 2400.....\$237.50	Supra 20 meg.....\$588.97	Xetec Graphix AT.....\$37.50
ACCESSORIES	ASTRA HD+.....\$827.50	SOFTWARE
64K Microstorer.....\$59.97	(includes DSDD 3.5" floppy and full one year warranty!)	MANY GAMES.....\$7.99 EA (call for current availability)
Mouse "Wave" Pad.....\$7.95	Paradox "IBM" drive.....\$217	Most Electronic Arts.....\$12.97
Disk Notcher.....\$5.97	SOFTWARE	Invitation to Programming
12" Printer Stand.....\$9.95	Publishing Partner.....\$97.50	Series (1, 2 & 3).....\$7.50 ea
15" Printer Stand.....\$13.95	Timeworks ST productivity series.....\$49.50 each	SynFile/SynCalc.....\$32.97
D. SKS	Public Domain library disks (write for entire list).....\$5 ea.	AlariWriter cartridge.....\$19.97
Sony SS/DD 3.5".....\$12.50	CALL OR WRITE FOR INFORMATION ON 8-BIT CLOSER SPEC-A-SI	APX Printer drivers.....\$9.75
Sony DS/DD 3.5".....\$19.50	Dr. T's KCS.....\$139.50	
Bonus 5.25" SS/DD.....\$5.97	Dr. T's Copystat.....\$142.50	
Maxell 5.25" SS/DD.....\$9.97	WE CARRY MIDI EQUIPMENT!	
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PC-DITTO \$89

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PCU-CHIPS B. ECONOMIC



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Atari and ST is a registered trademark of Atari Computer Corp.

PRODUCT REVIEW

Software certified to run under PC-Ditto (cont'd.)

Disptest
Download
EBL (Extended Batch Language)
Erag
Fancy Font
Fatdump
Fileminder
Fileminder
Flashcode
Form Manager
IBM Professional Editor
Keyword Commander
Lsd
Lu86
Lasercontrol 100
List2day
Mach2
Microsoft C Codeview
Move
Newkey
Norton Commander
Norton Utilities
Nosearc
Nostradamus Utilities
PC-Status
Page
Path Master
Printer Boss
Program Master
Query
R-DOC/X
Recall
RE/Call
Rendir
Screen Generator
Screen Sculptor
Sdir
Secure2
Setarc
Showback
Sorted Directory (d.Com)
Speedy3
SquareNotes
Stay-Res
Still River Shell
Superen
Sweep
SymDeb
Treedir3
UltraPrint
Ultra-Utilities
Util
VCopy
Watchdog
Wordtech dBase III Compiler
XTREE

9. Operating Systems

Compaq DOS
Eagle DOS
IBM DOS 1.1, 2.0, 2.1, 3.0, 3.1, 3.21, 3.3

10. Word Processing

Brown Bag Word Processor
DataFlex
Documax
Facelift 2
IBM Writing Assistant
LeScript
Lotus Manuscript
Microsoft Word
MultiMate
OfficeWriter
PFS:Professional Write
PC-Write
Volkswriter 3
Word Perfect

soft Basic, GW Basic for example, run correctly under *PC-Ditto*.

Several other programs are included on the *PC-Ditto* disk. PC-Menu allows you to change the external characteristics of your system, including default screen colors, graphics adapters (simulated, of course), disk drives, and keyboard. A format program allows you to format 80-track high-capacity (720K) 3½" disks under MS-DOS versions below 3.2. Since lower versions of MS-DOS can't read from such disks either, a device driver program is included to provide access to these high-capacity disks.

Also on the *PC-Ditto* disk is a program called SPEEDY3, a public domain program that speeds up the screen display of MS-DOS versions below 3.2. Another public domain program, QWICKEYS, speeds up cursor movement, particularly when a key is held down.

While some special-purpose hardware is not supported by *PC-Ditto*, about the only popular device that is not now supported is a mouse. However, Bill Teal tells me that he plans to provide mouse support in the near future. He intends to have the standard Atari mouse emulate a Microsoft, Logitech, or generic mouse. Actually, so few IBM software packages use a mouse, that such support is hardly vital, but it is nice to know that it is coming.

All in all, I am tremendously im-

PC-Ditto works as advertised—that is, it runs virtually any non-game IBM PC program flawlessly.

pressed by *PC-Ditto*. To turn an Atari ST, in essence, into an IBM PC with the addition of a \$269 5¼" disk drive and an \$89 software package is an amazing accomplishment and an outstanding value.

A handful of games won't run under *PC-Ditto*, but the best of them are already or soon will be available in ST format. The real value of the package is the capability it gives to the ST to run the vast library of IBM-compatible business/productivity software—and that it does with aplomb. To Bill Teal of Avant-Garde Systems goes my enthusiastic applause. ■

Software certified to run under PC-Ditto (cont'd.)

Wordstar
XY Write

11. Languages

ESIE
GW Basic
Microsoft C
Microsoft Macro Assembler
PC-Nibol
ProFlo
QPro4
Quelio 68000 Assembler Package
True BASIC
Turbo Pascal
Turbo Pascal Graphics
Turbo Prolog
XGEN
Zbasic

12. Training

AutoMentor
IBM Tutorial
Tutor

13. Database

Cornerstone
Enrich
File Express
FoxBase+
IBM Filing Assistant
Oracle
PC-File
PC Manager
PowerBase
PractiBase
R:base 5000
REQ
Reflex
Seekeasy
ZYIndex
dBase II
dBase III
dBase III Plus

14. Accounting

BPI Accounting Series
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There are many ways to transfer files and data from one type of computer to another: build or buy a communications cable (see "Making the Right Connection" elsewhere in this issue), upload files from computer A to CompuServe or some other timesharing service and download them on computer B, or, simplest of all, put the files on a floppy disk and physically transfer it from computer A to computer B. While this last method is simple, it is hampered by two factors: incompatible file formats and incompatible media.

Fortunately, the Atari ST reads and writes files in the same format as the IBM PC and compatibles, so file incompatibility is generally not a problem. However, until the recent introduction of the IBM PS/2 series a few months

ago, most of the IBM-compatible world used 5 1/4" floppy disk drives. Thus, although the file formats were the same, the media were different, and disk

swapping was not possible.

Now, however, two manufacturers are addressing the problem with 1/4" disk drives for the ST.

I.B. 5 1/4" Disk Drive

I.B. Computers has introduced a 5 1/4" floppy disk drive for the Atari ST which solves the incompatible media problem. Two versions of the drive are available, a 40-track version (compatible with most IBM PC and XT computers) and an 80-track version (compatible with the high density drives found on such 80286- and 80386-based machines as the IBM PC-AT). Because the vast majority of IBM PC software is currently published in the 40-track for-

I.B. 5 1/4" Disk Drive

Price: \$269.95 (40-track),
\$279.95 (80-track)

Interface: Standard Atari floppy disk drive connector

Summary: 5 1/4" floppy disk drive for reading and writing data on IBM-compatible media.

Manufacturer:

I.B. Computers
1519 S.W. Marlow Ave.
Portland, OR 97225
(503) 297-8425



The I.B. Drive (right) is somewhat larger than the Paradox Microbyte Drive, which uses an external power supply.

mat, that is the drive we chose to review.

Although there are a few—very few—IBM-compatible 80-track drives that will read and write 40-track disks, the I.B. Drive does not. Nor can it be made to do so by software packages that emulate 40-track drives on an 80-track unit. Moral: Don't buy an 80-track drive expecting to read both 80- and 40-track disks.

Installing the drive couldn't be simpler: on a 1040ST, you simply plug the disk drive cable into the floppy drive connector on the back of the computer, while on a 520ST, you plug it into the Out connector of drive A. Plug the power cord into an outlet, and installation is complete. Incidentally, the I.B. Drive must be drive B in the system.

Software

The I.B. Drive comes with a 3 1/2" floppy disk that contains three programs. The first program, RES.PRG slows down the stepping rate of drive B so it will read and write 5 1/4" disks correctly. It must be the first program executed in your AUTO bootup folder.

The second program on the system disk is FMT.PRG, a program to format 5 1/4" disks. Although the standard GEM format program will seem to run with drive B, it will not format disks correctly. A README file on the system disk gives detailed instructions for formatting 5 1/4" disks.

The instructions for the I.B. Drive

Two 5-1/4" Drives For The ST

By DAVID H. AHL

warn that you may have trouble reading with the ST MS-DOS disks that have been made on some IBM-compatible computers. If this occurs, you can format a blank disk on the ST with the I.B. format program, copy the files of interest onto it with your MS-DOS machine, and then read them on the ST. We tried the I.B. Drive with a variety of files produced on an actual IBM PC, a Compaq, and a very incompatible TI Professional and had no trouble going in either direction; no reformatting was necessary.

Obviously, the I.B. Drive does not compensate for differences in software. For example, ASCII files produced by *1st Word* contain embedded carriage returns and are not truly standard ASCII. Thus, *1st Word* reacts strangely to true ASCII files produced by another word processor like *MultiMate* or *Word Perfect*.

Likewise ST Basic will not run a tokenized Basic file produced by Microsoft Basic, although it will run Microsoft Basic programs saved in ASCII format. Software compatibilities aside, we had absolutely no trouble reading or writing ASCII data files and even some

basic programs that were created on an IBM compatible on the ST, and vice versa.

Summary

While we did not run an exhaustive benchmark, read/write speed on the ST seemed to be practically identical to that of our IBM compatible.

The I.B. Drive uses the proven Teac drive mechanism which should be reliable for many thousands of hours of use. We were pleased to see a quarter-turn lever to lock in the disks; in our experience, this is a considerably more durable mechanism than the more common flip-up door. I.B. backs up the drive with a four-month warranty.

The drive measures a reasonably compact 12" x 6" x 2 1/2" and is enclosed in a heavy gauge metal case. A red in-use light shines on the front, while the power switch and cable terminations are on the back.

All in all, we were very pleased with the I.B. Drive, its good performance, its reliable construction, and most of all, its ability to simplify the passing of data back and forth between the IBM world and the Atari world. ■

disk). This program slows down the stepping rate of drive B so that it runs at the same speed as a standard IBM drive and can read and write IBM-compatible disks.

The other two programs on the disk are format programs. One simply formats disks in one of four formats: 40-track, single- or double-sided or, if you have the Model B drive, 80-track, single- or double-sided. The other format program formats a 40-track, double-sided disk with a boot sector added.

Documentation with the drive is representative of all too many products we have seen in the Atari market, which is to say rather poor. The ten-page booklet (only five pages contain real information) explains how to unpack the box(!), connect the drive, format a 5 1/4" disk, and do minor troubleshooting.

Note that it does not tell you how to boot the drive the first time, whether you can boot from the 5 1/4" disk on which the boot program is furnished (you can't because it is drive B), or how to boot from a hard disk.

Performance and Reliability

The read/write speed of the Paradox Microbyte was virtually identical to an IBM PC compatible, which is not surprising, as the stepping rate and storage format are exactly the same.

The drive mechanism in the Microbyte is a Teac FD55BB, the same proven drive used in many clones and in the I.B. Drive. This mechanism uses a reliable quarter-turn lever to lock in the disk rather than the flimsier flip-up door. Paradox offers a six-month warranty on the drive.

The drive measures 10" x 6" x 2.5" and has a strong metal case. The external power supply measures 3.5" x 2.8" x 2.3" which negates some of the advantage of the small size of the drive case.

On the front is a red in-use light, which also flickers very dimly when the drive is turned on. A nice, long 30" connector cable is permanently attached to the back of the drive.

We used the drive to pass IBM-compatible data to and from a clone and had no trouble either reading or writing. We also used the drive with *PC-Ditto* to run IBM software on the Atari ST, also with perfect success.

We would like to see better documentation, but on all other fronts the Paradox Microbyte performs well. It is ruggedly built and sits nicely in a specialized niche in the ST market. ■

Paradox Microbyte 5 1/4" Disk Drive

Paradox Enterprises has introduced a 5 1/4" floppy disk drive for the Atari ST in two versions: Model A with 40 tracks (360K formatted capacity) and Model B with 80 tracks (1.2Mb formatted capacity). Like the I.B. drive, the 80-track version will read both 40- and 80-track disks, but will write only 80 tracks.

Following the Atari design philosophy for better or for worse, physically, the drive is in two pieces, the drive and the power supply. The advantages of this approach are that the drive itself is somewhat smaller and lighter than an integrated unit; the drive itself generates virtually no internal heat; the power supply can be put on the floor so stray radiation will not cause interference with your monitor; and the total length of power cord is over 11 feet. On the other hand, an integrated unit is tidier and more compact, and has fewer connections to come apart.

Installation of the Paradox drive involves plugging the interface cable from the drive into the back of a 1040ST or into the Out connector on drive A of a 520ST. In either case, the 5 1/4" drive

Paradox Microbyte Disk Drive

Price: \$235 (40-track); \$245 (80-track)

Interface: Standard ST floppy disk drive connector

Summary: Reliable 5 1/4" floppy disk drive for Atari ST.

Manufacturer:

Paradox Enterprises, Inc.
8444 E. 19th St.
Tucson, AZ 85710
(602) 721-2023

becomes drive B in your system. The power supply (11.5 vdc, 1.95 a) must be plugged into an outlet, and the female connector plugged into the drive. No, an Atari disk drive power supply cannot be used with the Paradox drive or vice versa.

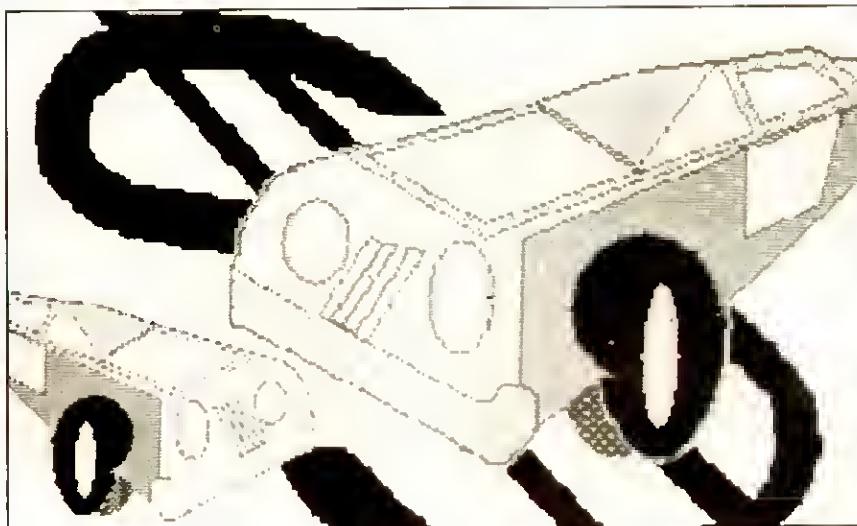
Software and Documentation

The Paradox Microbyte drive comes with three programs on a 5 1/4" disk. The program PARADOX is in an AUTO folder and must be loaded into the AUTO folder on your boot disk (floppy or hard

Some of the following problems can be solved in your head, some require pencil and paper, and still others require that you write a computer program. How many can you solve? Answers are on page 77.

Bobbi's New Car

When Bobbi bought a new Nissan Maxima, she planned to pay \$16,000 cash for the car from her savings account. However, the manager of the car dealership told her that she would be better off putting the \$16,000 into a 7% CD (certificate of deposit) and financing the car on a four-year loan at the current car loan rate of 10%. In this way, he said, she would collect over \$1600 more interest than she paid, because the interest on the car loan would be computed on a declining balance whereas she would collect compound interest on the entire \$16,000. What should Bobbi do?



Square Difference

Many numbers can be written as the difference of two perfect squares. For example: $5 = 9 - 4$, $20 = 36 - 16$, or $21 = 25 - 4$. Between 1 and 1000, how many numbers can be written as the difference of two squares and how many cannot? What is the general rule that describes the numbers that cannot be written as the difference of two squares?

Puzzles & Problems

By DAVID H. AHL

Condo Numbers

The builder of a new development of 100 condos sent Sam out to buy brass numbers for each unit. If the units are numbered from 1 to 100, how many of each digit (0 to 9) must Sam buy? At 79 cents each, how much will the numbers cost?

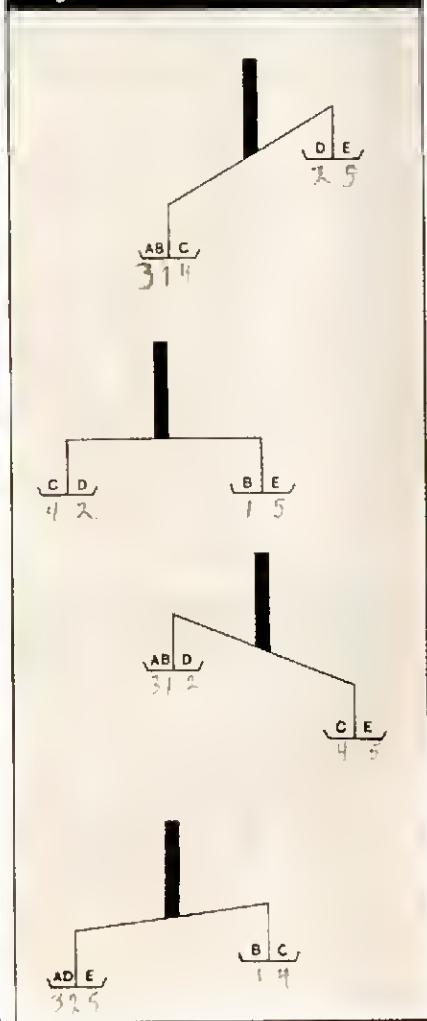
Same Result

What number, when subtracted from 100, gives the same result as when it is multiplied by 100?

The Weigh In

The weights A, B, C, D, and E represent 1, 2, 3, 4, and 5 pounds, though not in that order. From the scales shown in Figure 1, can you correctly name each weight?

Figure 1.



Fractional Sum

What is the sum of this series if it is carried on "forever?"

$$1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} - \frac{1}{32} + \dots$$

Largest Area

A quadrilateral has sides of length 5", 5", 1", and 7", in that order. What is its maximum possible area? What is the maximum area if the sides are 3", 6", 2", and 7" long?



Making the Right Connection

*Hints and a few
to help*

*small hardware projects
your ST communicate
with the outside world*

At a computer flea market, you see a Diablo 1650 printer/typewriter in excellent shape. The owner has been using it with a TRS-80 Model III and wants 200 bucks for it. He knows it connects to a serial port because that's how he had it connected to his Model III, but that's all he can tell you. You know this would be a terrific deal if you could hook it up to your 520ST. But can you?

A liquidator is having a closeout sale on NEC 8201 laptop computers (similar to the Radio Shack Model 100) for \$249 each (original price \$799). You'd love to get one for writing letters and memos on plane trips and for collecting data from your customers if only you could transfer the information into your

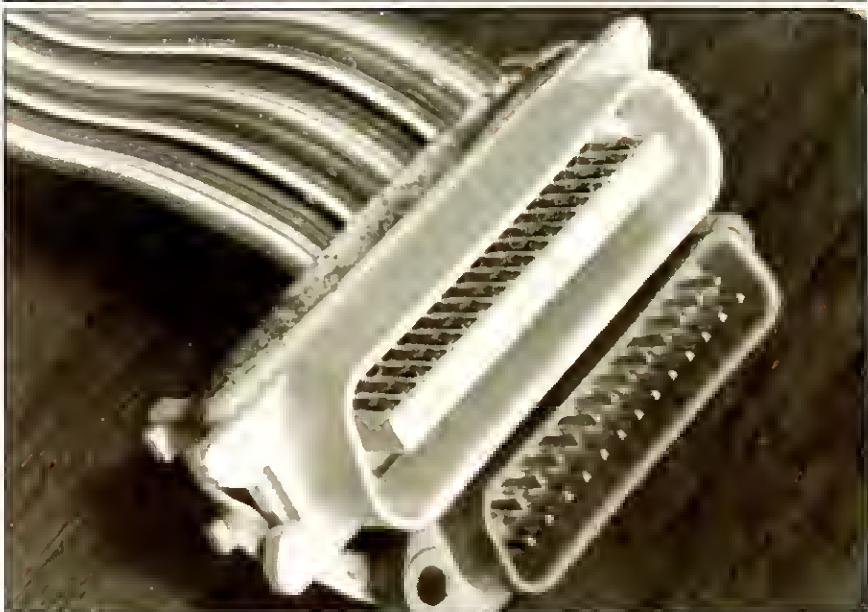
1040ST when you got back home. But can you?

You have a US Robotics modem in the closet that has been gathering dust ever since you stopped using your SpectraVideo computer. Unfortunately, the dog mistook the colorful connector cable for some new-fangled collar and chewed it up ages ago. You'd sure like to use the modem with your ST to check out some of those new Atari SIGs that Anderson wrote about in the last issue of *Explorer*. But can you?

To all of these questions, the answer is "yes." Moreover, you can make the necessary cables yourself and gain a good understanding of how your ST talks to other devices in the process. How, you say? Read on.

By RALPH TENNY

Photo 1. The business ends of a printer cable.



The Atari ST is a very powerful computer which just happens to be easier to inter-connect with external hardware than many other computers. But before I give you the specifics, let's have a quick look at the interface ports that make it all possible:

- Standard serial port. This port allows you to connect a modem, serial printer, or other standard RS-232 device to your computer or to create a local direct link between computers.

- True parallel port. This port, which is available for a parallel printer, is bidirectional rather than output-only like normal Centronics printer ports.

- MIDI port. This port can be used as an interface for a musical instrument. It offers a high speed asynchronous serial current loop.

- DMA (Direct Memory Access). This parallel port is capable of very high speed communication. It is usually used for a hard disk drive.

- Disk port. This port is designed for a

The Atari ST is a very powerful computer which just happens to be easier to inter-connect with external hardware than many other computers.

Figure 1. Centronics printer port

1	STROBE*	19	GROUND
2	DATA0	20	GROUND
3	DATA1	21	GROUND
4	DATA2	22	GROUND
5	DATA3	23	GROUND
6	DATA4	24	GROUND
7	DATA5	25	GROUND
8	DATA6	26	GROUND
9	DATA7	27	GROUND
10	ACK*		
11	BUSY		

floppy disk drive. It can be used for other purposes, but to do so requires the addition of new drivers to the operating system.

- Joystick ports. These ports are used for a mouse, joysticks, and remote sensors.

The ST comes with a fully-compatible mouse, and connection of Atari floppy drives is very straightforward, so the first interfacing task most users face is that of connecting a printer to the ST.

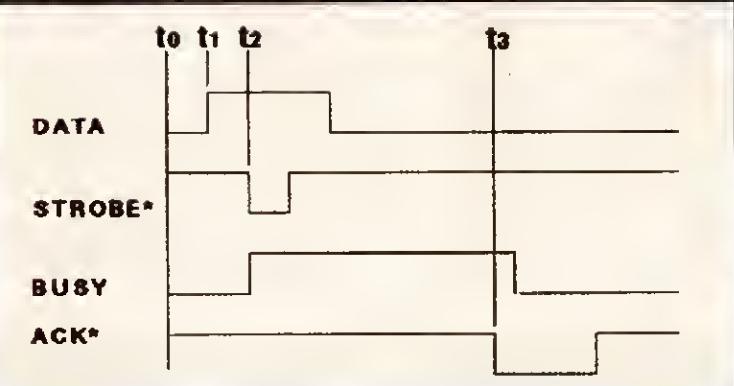
Building a Parallel Printer Cable

Nowadays, all popular parallel printers use the *Centronics parallel port*. It consists of eight data lines and two special signalling lines. It transfers one byte—eight bits—at a time, under control of the two signal lines. Figure 1 shows the connections, and Figure 2 shows how data is transferred.

Note that two of the signals include an asterisk (*) as part of the signal name, indicating that the signal is *active low*. An active low signal is normally high, and changes to low to signal an event.

Also note that the waveforms shown in Figure 2 have time marks (t_0 , t_1 , t_2 , and t_3) associated with them. When the computer tries to send data to the printer, the following things happen:

Figure 2. Printer input waveforms.



1. The computer checks the BUSY line; if it is high (logic one), the computer waits a while and tries again.

2. At time t0, when the computer finds BUSY low (logic zero), it writes one byte to the eight data lines (time t1) and then strobes (sends a short pulse to) Pin 1 of the port (t2).

3. When the STROBE line goes low, the printer reads the data lines and sends one byte off for processing. (Not all data sent to a printer is printed; some bytes are special control codes.) At the same time (t2), the printer sets the BUSY line high to prevent the data from being changed until processing is finished.

4. As soon as the printer finishes processing the byte of data, it pulses the ACK* (Acknowledge) line low (t3) and soon sets the BUSY line low again, allowing the next data byte to be sent. (Actually, the ST does not use an ACK* signal; it reads only the BUSY line. See Figure 2.)

Note that in Figure 1 each data line is paired with a ground connection. Figure 3 shows the schematic for a flat or *ribbon* cable to connect a Centronics-type printer to the Atari ST. Note that the signal lines alternate with ground wires, which happens automatically when a flat cable is used.

Photo 1 shows the two different connectors at opposite ends of a ribbon cable. At the printer end (left) is a *blue ribbon* connector, and at the other end is a DB-25 type, a style that is most familiar as a connector on RS-232 serial devices. On the ST, the computer end of the serial cable is a female connector (sockets), and the printer cable is male.

If you want to build a printer cable for your ST, I recommend that you start with a flat cable, because it is easier to work with. The cable can be up to 6' long, but don't make it longer than you need for your particular computer setup.

Figure 4 describes the parts you will need for the cable and lists the corresponding Radio Shack part numbers for your convenience. Because the ST printer port and the printer connector have matching pinouts, using a ribbon cable automatically gives you the schematic shown in Figure 3.

Two kinds of cable are available—multi-color ribbon like that shown in Photo 1 and single-color (blue or grey) cable like that shown in Photo 2. With the kind of connector we will be using, the single-color seems to work better.

The cable is very easy to build. Begin

Photo 2. The connector helps align the cable during assembly.



Figure 3. Printer cable schematic.

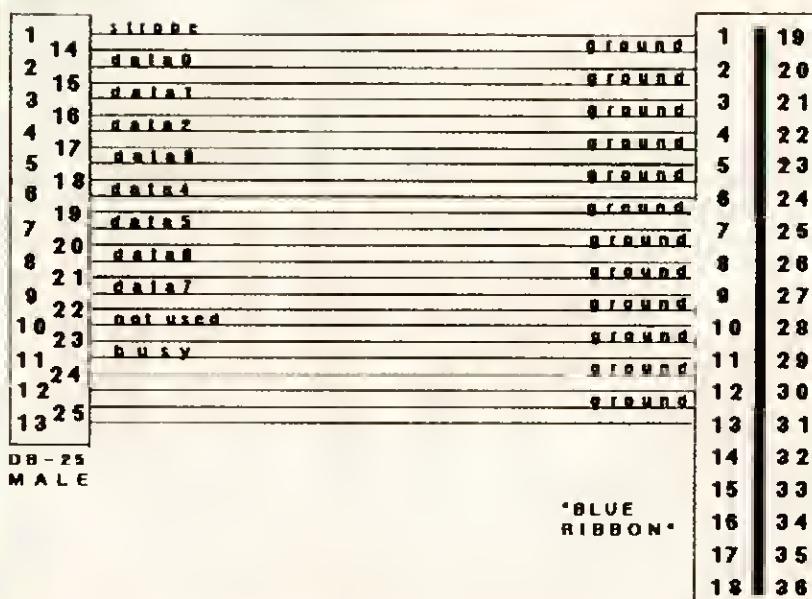


Figure 4. Parts list for printer cable.

Description	R/S Part No.
DB-25 male connector	276-1559
"Blue Ribbon" male connector	276-1533
25-conductor flat cable	278-772

by cutting the flat cable to the length you need; cut straight across with heavy duty scissors. No matter which color cable you use, one edge wire will have a distinctive marking. Study both connectors until you can identify Pin 1 of the connector. Be sure to keep track of Pin 1 during assembly, and place the connector over the cable so that the marked wire will connect with Pin 1.

Photo 2 shows a close-up of one of the connectors with the cable inserted. Note that the connector is not engaged fully, but the top part of the connector has grooves which help align the cable.

Carefully maintain this alignment as you place the connector and cable into a vise as shown in Photo 3. Very slowly tighten the vise until tiny clips on the connector ends engage, locking the connector closed. Use only enough pressure with the vise to close the connector; excess pressure may crush the connector or bend the pins.

Do the other end the same way, making sure that the marked wire fits into Pin 1 on the second connector also. That's all there is to it—instant cable with no soldering!

Building a Serial Cable

There are basically only two kinds of serial cables—one that allows computers to talk to each other and one that allows computers to talk to peripheral devices like modems and serial printers.

Figure 5 shows two elementary connector pinouts—one for computers and one for peripheral devices. The computer sends out serial data on Pin 2 and receives on Pin 3; peripherals receive on Pin 2 and send on Pin 3. Both types of devices use Pin 7 as circuit common or ground.

Communication between two machines is very easy if there is not a speed problem. For example, if a printer can print at 50 characters per second and the computer is sending at 300 baud (30 characters per second), typically, no handshaking is needed. In other words, the computer does not have to wait for a Ready signal before it sends the next data byte, because the printer is processing data (printing characters) faster than the computer is sending them.

But 300 baud seems a painful compromise when you know that the ST can send at 9600 baud. To alleviate this pain, you might try a print spooler program, which runs in the background and sends data to the printer when it needs it, so you can compute and print at the same time. Another solution is a

printer buffer, which reads in a whole file at high speed and sends it to the printer as it needs it.

Both the print spooler and the printer buffer require some kind of handshaking signals to prevent data from being lost. The RS-232 standard defines some extra signals to provide for handshaking and modem communications.

Figure 6 shows the additional connections defined for RS-232 use as implemented on the ST. The new signals are:

- RTS (Ready To Send). A signal sent by the computer to say "computer ready."
- CTS (Clear To Send). Sent by the peripheral to indicate Not BUSY.

Photo 3. Squeeze only hard enough to close the connector.



- DSR (Data Set Ready). Peripheral ready.
- DTR (Data Terminal Ready). Computer ready.
- DCD or CD (Carrier Detect). The modem has detected a carrier tone, which means that an outgoing call has been answered by another modem.
- RI (Ring Indicator). Modem has been called by an outside line or another computer (incoming call).

Without special software or a hardware adapter, the CTS signal does not work properly on current ST models. This input would normally come from the BUSY line of the printer, the status of which changes only when the printer is BUSY or the buffer is full. The current ST operating system, however, expects the status of this line to change after each byte is sent.

This minor anomaly has been corrected in the new Mega ST machines, and owners of older machines who purchase new ROMs to support the Blitter chip will find that the CTS signal is handled correctly as well.

Building an ST Modem Cable

Figure 7 shows the schematic of a modem cable for the ST. Note that the connections all go straight through, so a flat cable can be used. Unlike the printer cable, the modem cable can be almost any desired length up to about 50'.

Figure 10 lists the part numbers and descriptions of the parts needed to build this cable. The parts list includes connector hoods, which dress up the connector and support the cable against handling stress. I strongly recommend the use of hoods on any cable you intend to keep for any length of time.

Computer-to-Computer Communication

Serial communication between two computers can be easy or tricky, depending on which two computers you use. The problems can be caused by hardware (incompatible connectors) or software (differences in the operating systems). I recommend that you use a communications or terminal program such as *ST-Talk* on the ST. This type of program automatically captures data from the serial port and saves it in a buffer. You can then save the data in a file under the control of the same program.

Figure 8 shows the schematic of a cable that allows me to upload from my Radio Shack Model 100 laptop computer to my ST. In fact, this article was started while I was on an auto trip!

Note that the connections in Figure 8 do not go straight through. You will need to use regular (round) multi-wire cable and DB-25 connectors with solder connections (as shown in Photo 4) or crimped pins. Be sure to use a cable which has stranded (not solid) wires. Figure 10 is a suggested parts list for this cable.

Building a Null Modem

A null modem is a short cable that has special interconnections which simulate a modem link. The schematic for a null modem is shown in Figure 9. If you build such an adapter, using the parts suggested in Figure 10, you can use the cable described by Figure 7 along with the adapter.

Provided that the connectors on both computers are compatible, the null modem/cable combination should solve most connection problems involved with data transfer between computers. If both computers have terminal programs (one is built into the Model 100), it should be easy to transfer files both ways.

Photo 4. Some DB-25 connectors require soldering.



Figure 5. Connector pinouts.

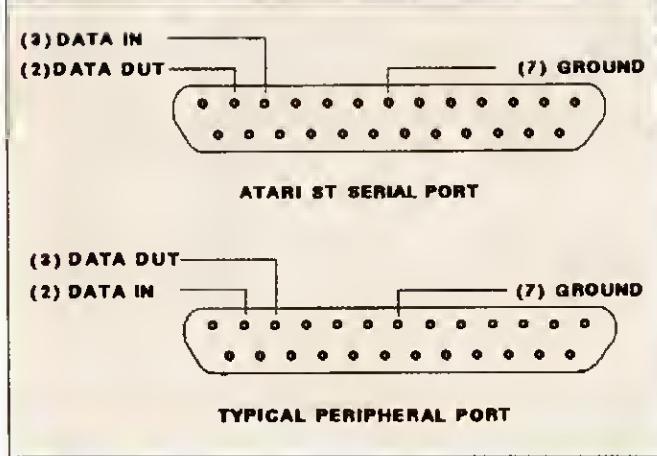


Figure 6. Pinouts for RS-232 connectors.

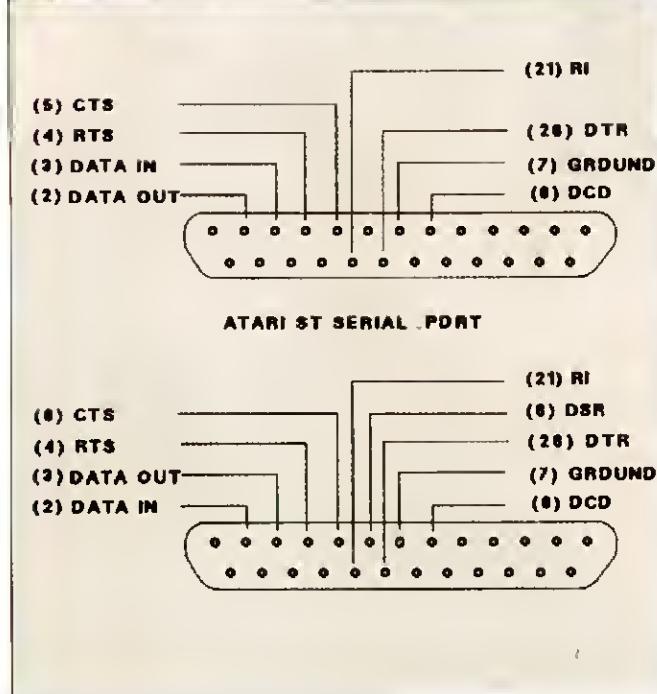


Figure 7. Communications cable.

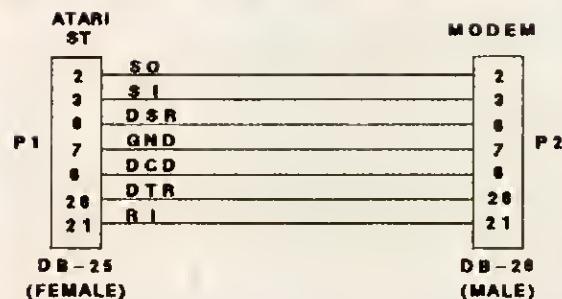


Figure 8. File upload cable.

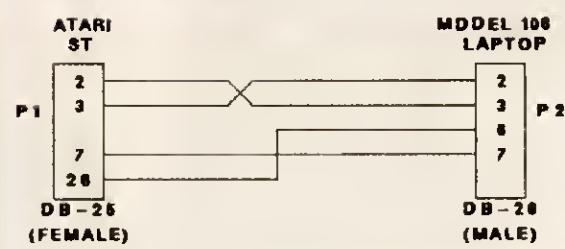


Figure 9. Null modem.

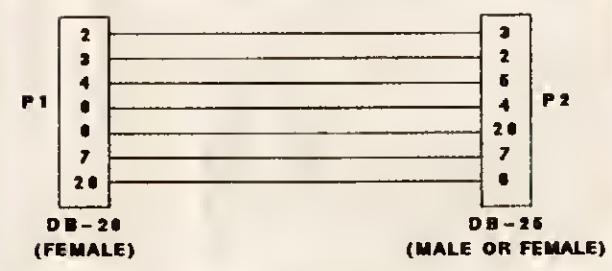
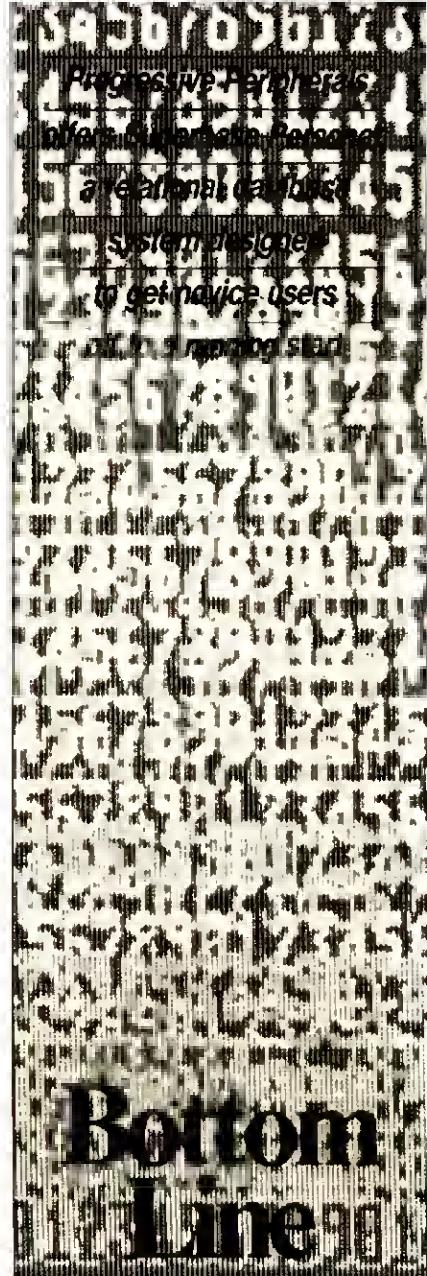


Figure 10. Parts list for RS-232 cables.

Description	R/S Part No.
DB-25 female connector, flat cable	276-1565
DB-25 male connector, flat cable	276-1564
25-conductor flat cable	278-772
DB-25 female connector, stranded cable	276-1548
DB-25 male connector, stranded cable	276-1547
7-conductor stranded cable	None



Bottom line

By TED CHIPPS

The *Superbase Personal Relational Database System* from Progressive Peripherals and Software has all the earmarks of a best seller. I predict that it will win the hearts of the point-and-click executive elite and all others who either hate to or don't know how to type, but who nevertheless require a powerful relational da-

tabase for data storage and manipulation.

This extraordinary program practically eliminates typing except for certain values, passwords, and regular data entry work. Unfortunately, however, the designers of *Superbase Personal* did not include a scanner with which to read your mind, so from time to time you will have to type in the words and numbers needed to make the program work for you.

Novice database users and busy businessmen will also love this program. A combination of pull-down menus and dialog boxes lets you issue highly complicated commands to *Superbase Personal* quickly, easily, and almost magically, using only the mouse. Yet, total keyboard control, using Alternate key and letter codes, is available for those who prefer not to remove their hands from the keyboard.

Yet, all of the features listed above are really just extras; the most important thing about *Superbase Personal* is that it is a *relational* database. This means that it is capable of searching not only the current file but all files that are open and related by a similar field. This is an extremely useful structure and one that can save time—and often money—for those who want to integrate information from a variety of files in a single report.

For example, if you run a small business, you might want to keep one list (or database) of customer names and addresses for catalog and promotional mailings and another of the purchases those customers make for billing purposes. Instead of including each customer's first name, last name, street number, street name, city, state, and zip code in each file, you could assign each customer a unique customer number that would be included in both databases.

Superbase Personal would then be able to create a report that would show a customer's name and address, list the products purchased along with their prices, and calculate the total cost.

Using the above technique, you save time and computer memory space and reduce the possibility of error, because you do not have to enter the name and address more than once.

If you are new to databases, don't let this power intimidate you. The excellently prepared documentation includes

four tutorials designed to demonstrate the utility and ease of use of the various facets of the program and to make a novice into an expert in relatively short order.

To give you a feel for the variety of tasks you can accomplish and the ease with which you can accomplish them using *Superbase Personal*, I will discuss the tutorials in detail.

Getting Started

The first tutorial introduces you to one of the truly unique features of *Superbase Personal*, a VCR-like control panel that can, among other things, fast forward you through your file as fast as you want to go. The 12 buttons that make up the Control Panel—Current Record, Next Record, Previous Record, Fast Forward, Fast Backward, First Record, Last Record, Pause, Stop, Lookup, Filter, and External File—line up across the bottom of every screen.

As you get started, you can test these handy point-and-click buttons on the three different displays through which *Superbase Personal* allows you to view your records.

The availability of three screens is quite a bonus; most databases offer only two. All but the most rudimentary offer a version of what *Superbase Personal* calls Form View, a screen on which you can construct your own layout for reports and labels.

For their second view, other programs usually take one of two approaches. They show either a vertical list of fields with corresponding data displayed alongside, which *Superbase* calls Record View, or a horizontal list of fields set up like the headers on a spreadsheet, which *Superbase* calls Table View.

Each display offers advantages for particular kinds of files. For example, Record View, with its vertical field presentation, favors a database with a large number of fields, because it allows more fields to be seen onscreen at once. Record View, then, would be ideal for personnel files, doctors' and dentists' patient files, and other databases that include large quantities of information in each record.

Table View, with its horizontal, columnar display, is best for records that have fewer, shorter fields and more arithmetic features. Table View would, for example, present mailing labels very

well, because it would allow you to view the entire label in one line across the screen.

The Main Display is your permanent window on your database. It is like a large worksheet 273 columns wide that allows you to view the records in your database.

The field names, of which there can be up to 999 for each record, appear on the left-hand side with the data to the right. If data for a given field is longer than the window is wide, the program extends the information off to the right, and the scroll bar at the bottom of the window brings it into view.

By turning off the Paging option on the Set Up menu, you can scroll the data in your file through each view using the buttons on the control panel. The Open Fields option on the Project Menu lets you select which fields you want to display.

The Key Lookup button (the boxed question mark) on the control panel is used to retrieve individual records. You enter a value for the field on which the file is currently indexed, and *Superbase* uses the index to find and display it.

Another powerhouse command is invoked by clicking on the Filter button located to the immediate right of the Key Lookup button at the bottom of the screen. The Filter allows you to enter a set of values—as simple or as complex as you like—that restrict the display to the records that match those values.

Most other file managers can sort only one value in a particular field at a time. *Superbase* lets you sort on as many values as you can list in the 255-

column line.

When you click on the Filter button, the Filter dialog box appears on your screen (see Figure 1). It displays the field name panel, the operators, the value box, and the main box. A Filter is created as you click on field names and operators and type in the desired values. The Filter command then appears in the main box.

Because *Superbase Personal* uses filters in several other functions, you will want to become adept at using this dialog box. Once mastered and understood, the concept of the filter paves the way for more powerful relational commands, including Update and Query, which can involve multiple files.

Creating a Database

The second tutorial takes you

through the creation of your first database, using data provided in a file called BANK.sbf. Here you learn that every file has three components—a data file, an index file, and a definition file, usually referred to as the "file definition."

The data file holds the actual record data that you key in through the Record Menu options.

The index is a separate file that is related to the main data fields, and there can be up to 999 index files for each data file. This is important, because index fields provide a quick way to look up individual fields and a sequence for the presentation of records. Alas, the more indexes you use, the longer it takes to sort through your data.

When you begin creating your database, the File Definition panel requires you to categorize your fields as one of

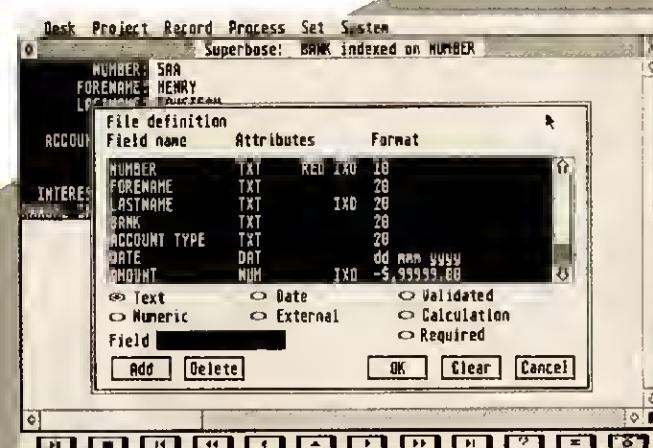


Figure 2. The File Definition dialog box.



Figure 1. The Filter dialog box.



Figure 3. The Field Length (text) dialog box.

four main types—text, numeric, date, or external (see Figures 2-5). You simply point and click on your choice.

Any of these fields (except external) can have a validation or calculation formula attached to it (see Figures 6 and 7). Once again, you have only to point and click until the information you want appears on your screen.

The External File system of *Superbase Personal* is a boon to those who need to access documents—even pictures—from outside the program. It permits access to files produced by other programs, including paint and draw programs and word processors. The External File sample (see Figure 8) displays some interesting pictures and demonstrates how useful this program can be to realtors, artists, or others who rely on graphics as well as text and numeric data in their businesses.

Manipulating Records

The third tutorial introduces you to the Record Menu and teaches you how to create, edit, duplicate, and remove records from the database called Bank that you have created.

The fourth tutorial covers all the single-file processing options on the Process Menu, leaving the two more complex multi-file options, Update and Query, for you to study and practice at your leisure.

Query (see Figures 9 and 10) is said by the documentation to be the very heart of *Superbase*. The Query Filter allows you to include fields from more than one file in the Filter command line. More than 23 pages of the manual are devoted to how to use Query, but if you understand how to use the Filter dialog

box, the actual execution of Query should pose no special difficulty.

The decision on how best to use this feature is a very personal one that will depend entirely on the use you plan to make of your database system as a whole. The documentation points out that many, many volumes have already been devoted to the subject of effective use of databases, and the authors of *Superbase Personal* refer you to this library for more information on the topic.

If there is a weakness in the documentation, it is in this section. While the documentation correctly states that Query and Report are central to the concept of database management, it neglects to provide a tutorial on either. A short tutorial, leading you through Query would have gone a long way toward dispelling any confusion about its use. Perhaps the authors thought that another tutorial would have made the manual too long or too tedious; perhaps

they will reconsider when they do an update.

In the last tutorial, you create a new file into which you can then import data. The data comes from the sample file ADDRESS.sbf provided on the disk, so you learn how to export data as well.

At the same time, the tutorial has you using some filtering techniques as you import the data into the file you have created. Then you print some of the imported records and labels for them. So, by the time you complete the last tutorial, you have had practice using all the important features of the program, and you should have a good idea how to begin creating a database with your own information.

After taking all this space to extol the virtues of the tutorials, it seems almost redundant to say that the documentation is terrific. In a humble sort of way, it even understates the incredible power of this program.

The only caveat I offer is that you

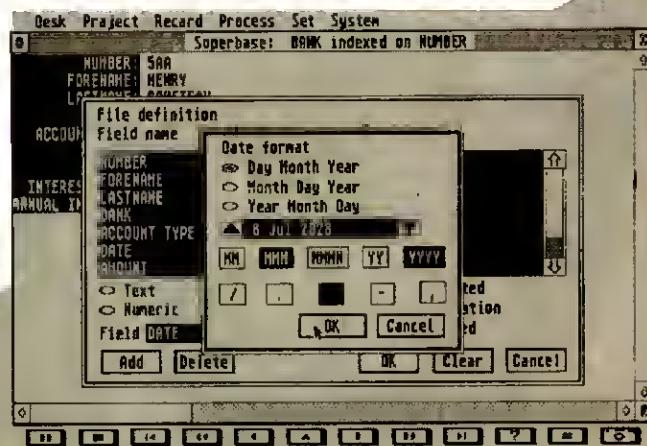


Figure 5. The Date Format dialog box.

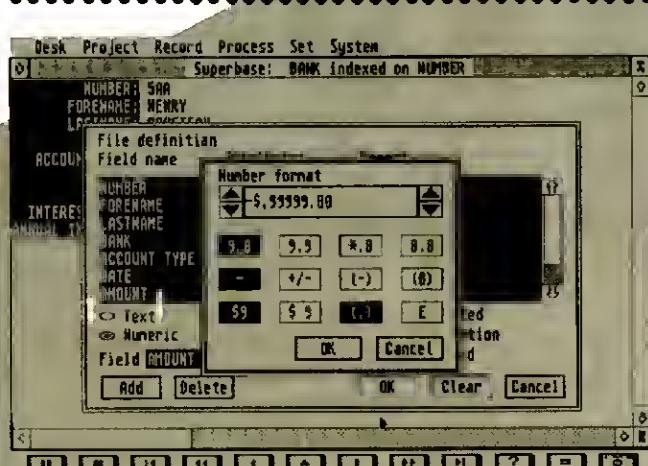


Figure 4. The Number Format dialog box.

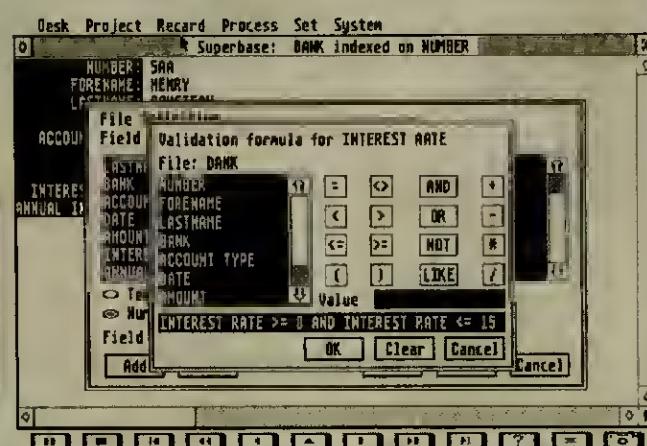


Figure 6. Entering the validation formula for interest rate.

really should have a full megabyte of memory to make effective use of *Superbase Personal* (see Figure 11). Trying to create a database of any size on an unexpanded 520ST will surely lead to frustration.

Special congratulations are in order for Simon D. Tranmer and Bruce Hunt for creating *Superbase Personal* and for Brian C. White for his marvelous implementation of the program under GEM.

Progressive Peripherals promises that there's more to come. *Superbase Professional* will feature an Application Builder that will allow you to design and draw business forms, a programming language with which you will be able to write program applications, and a word processor which will allow you to use your address file databases for mass mailings. Registered users of *Superbase Personal* will be able to purchase *Superbase Professional* at a reduced price. ■

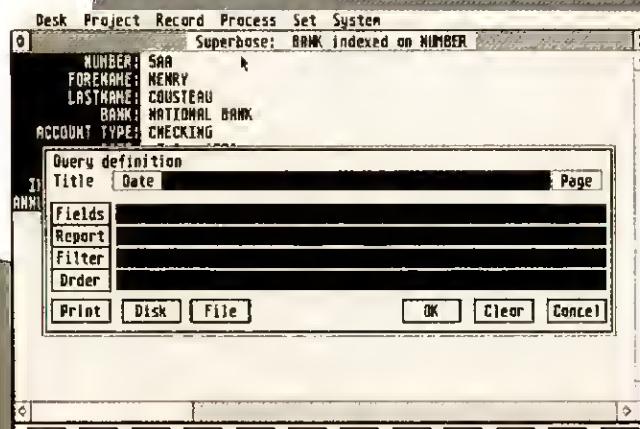
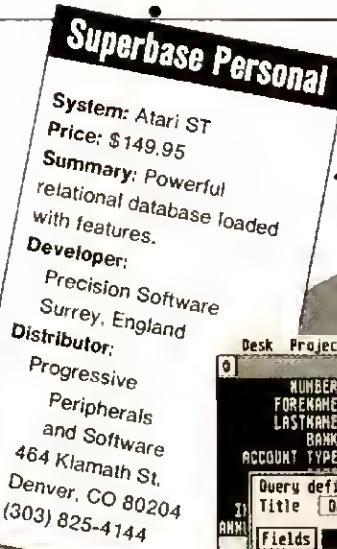


Figure 9. The Query Definition dialog box.

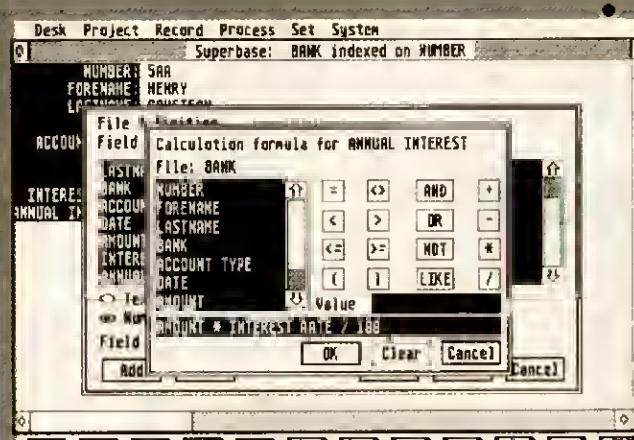


Figure 7. Entering the calculation formula for interest rate.

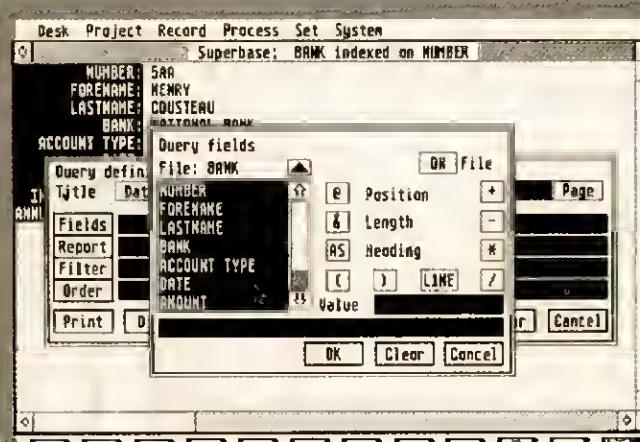


Figure 10. The Query Fields dialog box.

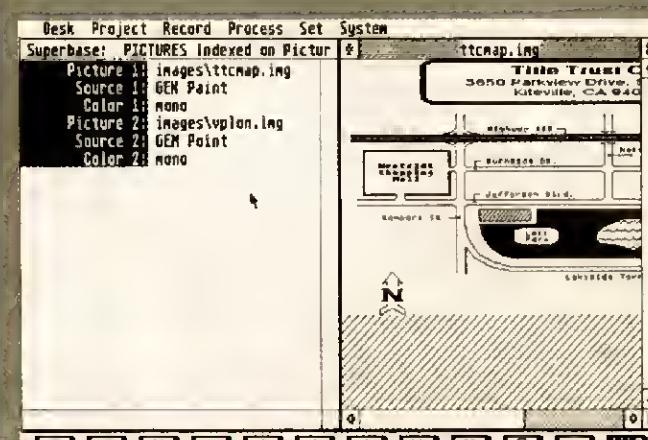


Figure 8. Graphic images created with other programs can be imported.

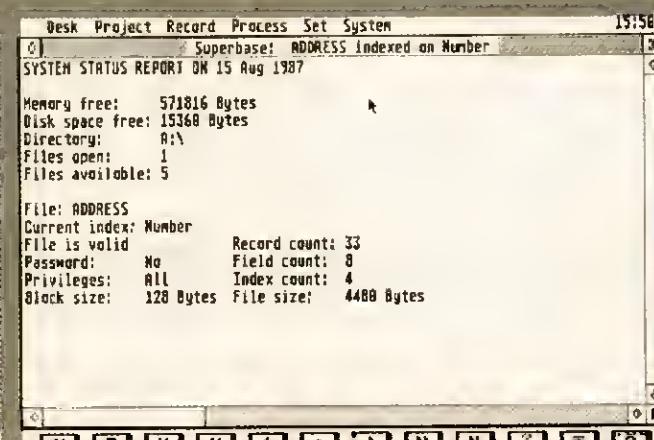


Figure 11. The System Status Report. Note that only about 60K would be free on an unexpanded 520ST.

1st Word Plus

GST Holdings has added all the bells and whistles needed to make

1st Word a truly full-featured word processor

Atari's *1st Word*, the word processor that came bundled with our first STs, has served *Atari Explorer* well. Because of its wide distribution, we standardized on the program and have been using it for all our editorial work for more than a year.

During that year, I have become quite accustomed to *1st Word* and find that it does most of what I want a word processor to do. I do, however, realize that my requirements are relatively simple and that there are people for whom *1st Word* just doesn't have enough features.

For them (and for me, now that I have come to depend on it) GST Holdings has released *1st Word Plus*, a full-featured word processor that can hold its own against the old fashioned control-code ridden word processors that dominate other markets—and still be easy enough for a school child to use.

I won't rehash the features of the original *1st Word*, except to say that they are all present in *1st Word Plus*. At first glance, the screen layout and many of the menus look familiar to the user of the original program. But closer inspection reveals some new menus and some extra choices under the old ones.

When you first boot up the program, you will notice that the familiar *1st*

1st Word Plus

System: Atari ST
(color or monochrome)
Price: \$99.50
Summary: A full-featured word processor that's easy to use.
Developer:
GST Holdings Ltd.
Cambridge, England
Distributor:
Electric Distribution
8 Green St.
Willingham
Cambridgeshire, CB4 5JA
England
011-44-954-61258

Word font table is spread out horizontally across the lower half of the screen rather than perched vertically along the right-hand side. An additional line across the top of the table tells you what printer driver is installed and which port it is using.

To the right of the font table is a new "key box," which allows you to space,

return, delete, backspace, tab, and create a fixed space without touching the keyboard. I suppose you could use this device along with the font table for one-handed text entry, but so far, I have been unable to conceive of a really practical use for the key box.

Across the bottom of the screen are the function key icons with which you can turn on and off boldface, underscoring, italics, light face, and insert mode; delete a line; force a page break; center text; indent; and reformat your text.

A handy new icon tells you when the Caps Lock has been activated, so you don't have to type a line in upper-case letters to find out that you have hit the Caps Lock key by mistake.

The File Menu

Under the File menu you will find the familiar commands that allow you to manipulate files, opening them, saving them, printing them, deleting them, and appending one to another. Two new entries in the File menu are Save and resume and Quit all. Layout has been removed and given its own menu.

When you save a file using Save and resume, you are not automatically returned to the Item Selector when the save is complete. Instead, your window remains open, and you are returned to the point at which the cursor was standing when the file was saved.

Save and resume has already saved me several hours' work by encouraging me to save frequently during summer thunderstorm weather. The few seconds I save each time the program does not force me to reselect the file on which I was working and then find the place at which I was working really seem to add up on a busy day.

The other new command in the File menu, Quit all, allows you to close all open windows simultaneously and return to the GEM desktop. You do get a chance to change your mind, so there is very little possibility that you will eradicate multiple files with a single stray mouse click.

Quit all is a nice addition, but I doubt that I will ever consider it indispensable.

The Edit Menu

On the Edit menu you will find the familiar, easy to use search and replace functions along with several nifty enhancements.

By BETSY STAPLES



Figure 1. The start-up screen displays the font table, key box, and function key icons.

If you click on Hyphenation, each time you reformat a paragraph, *1st Word Plus* will try to eliminate short lines by hyphenating long words. It always asks permission before inserting a hyphen by displaying the word it wants to hyphenate and showing you just where it plans to do it. You can accept the recommendation, move the hyphen, or tell *1st Word Plus* not to bother.

The algorithm used for recommending hyphenation, while not infallible, is quite respectable—about as respectable as the algorithm used by the mainframe on which we do our typesetting. Which is to say that you can trip it up with words like *NeoChrome*, but most of the time the breaks it recommends are correct.

One of the features I missed most in the original *1st Word* was the ability to count the words in a document. *1st Word Plus* counts not only words, but pages, lines, and bytes. It also tells you how much space you have remaining in RAM and on your disk.

The process of setting "bookmarks" in your text to make it easier to move about in a large document has been streamlined. When you choose Set mark from the Edit menu, a dialog box appears and asks you to choose a number (one to four) for that mark. When you want to return to one of your marks, once again, you simply click on the corresponding number, and before you know it, you can be at the other end of your document.

Goto page works similarly, with the obvious substitution of a page number for a mark number.

The Block menu in *1st Word Plus* is identical to its counterpart in *1st Word*.

You can mark blocks, either by using the rubber band or by clicking on Start block and End block. Once a block is marked, you can cut it, paste it, copy it, move it, delete it, find it, or hide it.

The Layout Menu

As mentioned above, Layout has graduated from a single dialog box to an entire menu. At the top of the screen you see the ruler line, displaying current margins and tab stops just as it does in *1st Word*, and you can still change the settings by clicking with the mouse. The difference is that now you can hide the ruler, if for some reason it offends you. Or, if you relate better to text than graphics, you can click on Show position and replace the ruler with a verbal display of page, line, and column numbers.

The Page layout option displays a form into which you can type your head-

choose pica, elite, condensed, or expanded characters simply by clicking on the corresponding box, and when you do, the number of characters per line is automatically adjusted to create a 6½" line.

You can also change tab spacing, adjust the length of your line, turn justification on or off, and set line spacing (from one to nine!).

In my review of *1st Word 1.06* (Spring 1987), I wished for a way to modify the default justification and line spacing settings. *1st Word Plus* has made provision for this—sort of. By clicking on Read ruler, you can choose a file from the Item Selector and have *1st Word Plus* read in the first ruler it contains.

This technique works, but it doesn't take any less time than simply resetting the ruler, so I am still wishing for a way to make double-spaced, ragged right

1st Word Plus can hold its own against the control-code ridden word processors that dominate other markets.

ers and footers, specify top and bottom margins, etc.

The Add ruler option gives you a great deal of control over the format of your document. Perhaps the most remarkable of the new features is the ability to specify the pitch (number of characters per inch) of your output. You can

text the default condition.

Footnotes

Having worked in academia prior to beginning my career in computer journalism, I know that the feature of *1st Word Plus* that will endear it to academics and other scholarly types is the

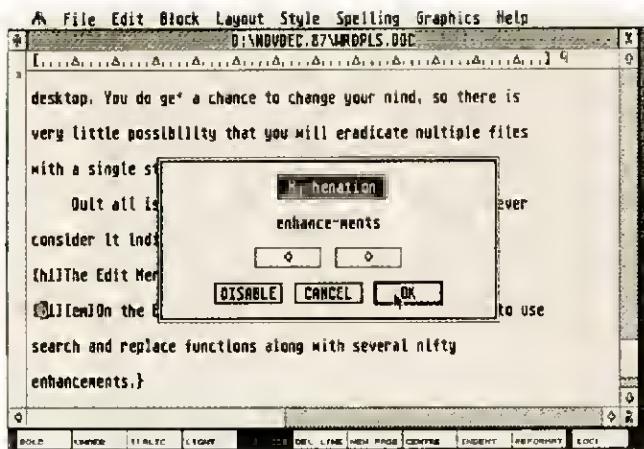


Figure 2. The Hyphenation option automatically hyphenates words to eliminate short lines.

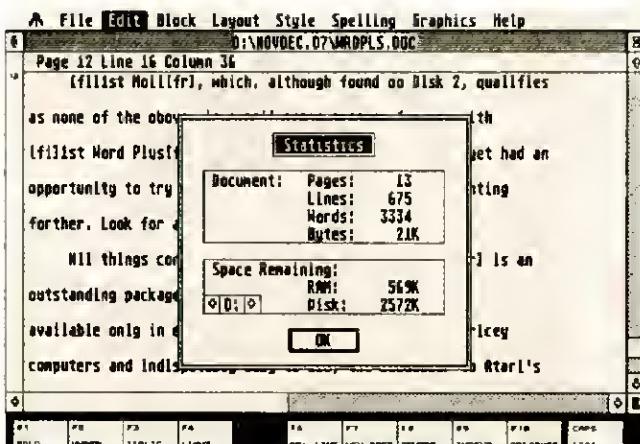


Figure 3. The Statistics option offers a variety of information about your document. Note the position indicator at the top of the page.

ability to create footnotes in a totally painless manner.

I have overseen the typing of countless doctoral dissertations and watched the destruction of even more pages of carefully typed text when typists reached the bottom of the page only to discover that they had failed to leave enough room for the footnotes. *1st Word Plus* eliminates this problem completely.

To add a footnote to your dissertation, research paper, or scholarly article, all you need do is click on Add footnote. The program keeps track of the numbers and inserts them in order in superscript text right where the cursor is when you click. A footnote window opens at the bottom of the screen, and you type in the appropriate information. When the document prints out, the footnotes appear tidily at the bottom of the page.

The Footnote format option displays

an easier way to integrate the plagued things into any manuscript.

The Style Menu

The Style menu offers a choice of boldface, underlined, italic, light, superscript, and subscript type. If you have already typed a piece of text in one face and want to change, you simply select the section you want to change with the rubber band, click on the new face, and then click on Restyle. The change is effected instantaneously.

You can also change the justification of your text from the normal left or right-and-left to right or centered.

In addition, options that allow you to indent portions of text and reformat all or part of your document are available on this menu.

Spelling

Spelling is another new heading on the menu bar. When you first boot the

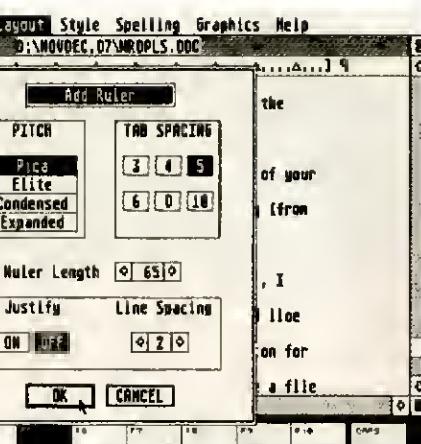


Figure 4. The Add ruler option offers great flexibility in determining the layout of your document.

lary dictionaries, so you just click on OK. If you read the documentation, you will discover that you must create a supplementary dictionary if you want to add your own words permanently. You will not, in all probability be able to figure out how to do it.

I used the program for several weeks before I figured out that you must click on End spell check at the end of each session with *1st Word Plus* to create and/or augment your supplementary dictionary.

Whether or not you have added words of your own, you can check the spelling of the words in your document in two ways. You can either wait until the document is complete and then check the whole thing at once, or have the program check each word as it is typed.

If you choose to wait until the end, you place the cursor at the top of the file and either click on Check spelling or press Esc. Each time the program finds a word that is not in its dictionary, it stops and allows you to fix it, add it to your dictionary, or ignore it.

If you don't know how to spell the word in question, you can choose Browse . . . , which opens the dictionary to a page filled with similar words. If it is not immediately apparent to you which word you want, you can ask the program to suggest a substitute or you can simply page through the dictionary until you find it. If it is a word that is spelled correctly, you can add it to your supplementary dictionary, either by clicking on Add word on the main menu or ADD in the Browse . . . window.

If you find the word you want by browsing, you just click on REPLACE

It is somewhat disconcerting to find that the program questions the spelling of words like "color" and "center" and lacks such all-American entries as "baseball."

a box that allows you to specify how many lines you want above and below the footnotes and how long you want the rule between text and notes to be.

I haven't typed a footnote in about ten years, but I can appreciate the utility of this feature on behalf of those to whom they are important. I can't imag-

program, Load dictionary is the only option available. When you click on it, the busy bee appears for about half a minute. When it finally disappears, it is replaced by the Item Selector, which displays a list of available supplementary dictionaries.

At first, you will have no supplement-

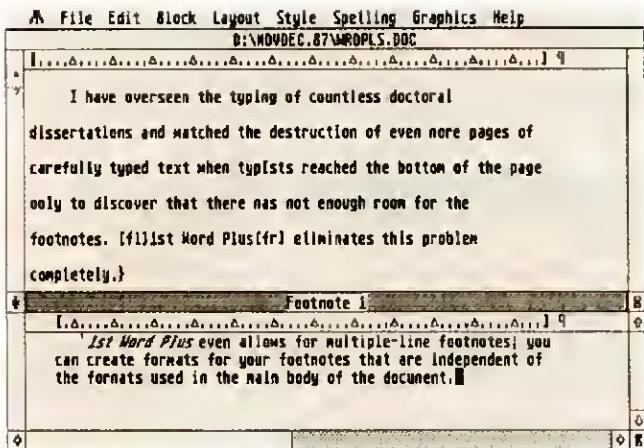


Figure 5. The Footnote option automatically inserts footnotes at the bottom of the appropriate page.

and the substitution is made for you.

If you choose Continuous check, the program beeps when you type a word it does not recognize and then offers you options listed above. This is the mode I prefer; the only disadvantage is that if you are a very fast typist, the warning beep is so short that you may not notice it.

At first it is somewhat disconcerting to find that the program questions the spelling of words like *color* and *center* and lacks such all-American entries as *baseball* and . . . well, *America*. This is easy to understand, however, when you remember that *1st Word Plus* was developed in the U.K. All you really have to do to remedy the situation is enter your own words and spellings (after checking them in a real dictionary, of course).

I am a reasonably good speller, so I can't comment on the utility of this feature for bad spellers; if nothing else, I guess it would help one decide which words to look up. I can say with certainty that it is useful for bad typists—of which I am one. The *1st Word Plus* spell checker helps you catch transposed letters and omissions. It cannot, however, tell you that you intended to type *an* instead of *and*, so real proofreading remains a necessity.

The Graphics Menu

I received a letter from one of our authors today. In an effort to catch my attention and make me feel guilty for not responding sooner to one of his queries, he pointed a graphic, guilt-inducing finger at my nose from the top of his letter. He then went on to explain that he had prepared the letter using *1st*

Word Plus.

The program disk includes a desk accessory called SNAPSHOT.ACC, which can be used to save images displayed on the screen by GEM-based drawing packages. Images created with *Degas* can be captured using a special program called DEGASNAP, which is also supplied.

Once an image has been saved, it can be pasted into a document by clicking on Graphics mode and Read picture on the Graphics menu. Once pasted in, it can be moved about on the screen, and you can add text on and around it.

This ability to integrate text and graphics will be of special interest to would-be desktop publishers—especially those who don't need a wide variety of typefonts.

Using the Program

In use, *1st Word Plus* is almost identical to its predecessor, and users who

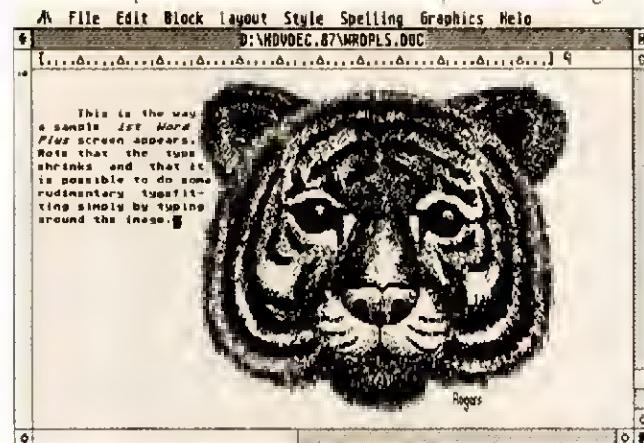


Figure 7. Graphics can be added to text with the click of the mouse button.

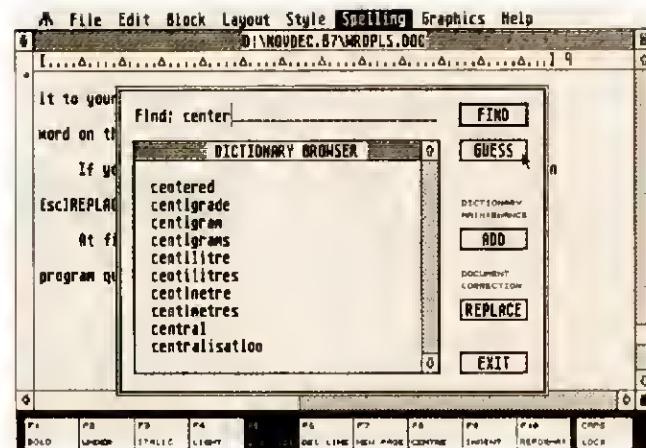


Figure 6. The Browse . . . function allows you to search for the correct spelling of a word.

have mastered *1st Word* will have no trouble whatsoever making the transition to the enhanced version of the program. Files are, of course, totally compatible.

The only danger is that *1st Word* users will neglect to read the documentation and miss some of the new features.

I noticed only two slight differences in the actual performance of the program. One is that the delete line function works a little more slowly than in earlier versions and ceases deleting lines the moment your finger leaves the F6 key. There seems to be no buffer, so it is now unlikely that you will, as I have done many times, obliterate lines of wanted text by holding F6 down too long.

The other minor difference is that when you do a search and replace, the slider moves up or down the vertical scroll bar to indicate the progress of the search. This gives you something to look

at while your document is being searched, but really serves no useful purpose that I could discern.

I have heard from several people that *1st Word Plus* is "buggy," so I have been on the lookout for peculiar behavior. The only thing I can cite is the refusal of the Item Selector to accept an extension on the directory line.

If I type D:\NOVDEC.87*.DOC in an attempt to display only my text files for this issue, that designation flashes on the directory line for a fraction of a second only to be replaced by D:\NOVDEC.87*.* which lists all the programs, resource files, backups, etc. in that folder. These irrelevant listings soon cause the capacity of the directory window to be exceeded, leaving me at a loss as I try to remember whether I called the current "Sound Chip" file SNDCHIP or SDCHIP (our typesetting program allows only six-character filenames).

The only other problem I had was an inexplicable crash that occurred as I returned to text mode after manipulating some graphics.

Save and resume has already saved me several hours' work by encouraging me to save frequently during summer thunderstorm weather.

On the positive side, twice in the past week, a *1st Word Plus* file on which I was working survived a brief power outage, allowing itself to be saved on a floppy disk even though my hard disk had forgotten that it ever knew me.

As for changes I would suggest for future versions, the only feature for which I still long regularly is the ability to create macros. How I would love to be able to define at the start of a review a short sequence of keystrokes that would substitute for the name of the product under consideration. Without macros, I have to type [fi]1st Word Plus[fr], for example, each time I want *1st Word Plus* to appear on the printed page.

Yes, you can achieve the same effect

with cut and paste and block copies, but only to a very limited extent. You can also substitute a single symbol—a curly bracket or an asterisk—for a frequently-used sequence and then use the Replace function to replace it with, in this case, the name of the product. This works reasonably well and is, in fact, what I usually do. The only drawback is that *1st Word Plus* does not automatically reformat your text when such a substitution creates a long line.

Documentation

The User Manual is a three-ring binder enclosed in a sturdy slipcase. The text is professionally typeset and printed on heavy coated stock that will probably outlast the magnetic medium on which the program is encoded.

Sample screens and other useful examples are plentiful and helpful. The information is well organized, and with the help of the seven-page table of contents, I had no trouble finding answers to all of my questions (except the one about creating a supplementary dictionary).

1st Word Plus is, without a doubt, the best-documented piece of software for the ST I have seen to date. From layout to writing style to simple durability, it is a truly professional piece of work.

The package includes two disks. Disk 1 includes everything you need for basic word processing. Disk 2 includes the snapshot utilities, printer drivers, and assorted odds and ends.

1st Mail, which, although found on Disk 2, qualifies as none of the above, is a mail merge program for use with *1st Word Plus* and *1st Word*. I have not yet had an opportunity to try it out, so I will refrain from commenting further. Look for a short review in an upcoming issue.

All things considered, I think *1st Word Plus* is an outstanding package. Loaded with features heretofore available only in expensive programs for powerful but pricey computers and indisputably easy to use, the successor to Atari's modest *1st Word* is a worthy contender in the continuing battle for word processing supremacy. ■

ALICE The Personal Pascal

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"From here on you had better think of Atari as a major player in the computer game."

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Alice Pascal

*Looking Glass Software introduces a language
that encourages structured programming practices*

Alice Pascal

System: Atari ST

Price: \$79.95

Summary: An excellent implementation of Pascal for beginners and advanced users alike.

Manufacturer:

Looking Glass Software
124 King St., N
Waterloo, ON N2J 2X8
(519) 884-7473
(800) 265-2782

This is a tale that begins at the dawn of computer history, when programmers fed stacks of punch cards to baleful looking machines covered with flashing lights. Not long after those first computers did their earliest computing, it became apparent that programs written with GOTOS were frequently hard to read, harder to debug, and almost impossible to maintain. So, by the mid-sixties, the programming gurus had determined that to solve all possible programming problems, a language must contain sequential execution, looping (FOR, WHILE, REPEAT) and decision (IF ELSE) structures.

The Great Structured Language Debate

The debate that surrounds structured programming sounds like the sort of argument that should be relegated to the dusty technical journals decaying on the shelves of university libraries. And it would be, were it not for the efforts of companies like Atari, which have put computers in millions of homes and businesses.

As a result, millions of people have learned to program in Basic, a programming language developed for nonprogrammers at Dartmouth College—a programming language, which, with its line numbers and GOTOS, encourages the development of an unstructured programming style.

If the use of GOTOS were the only point of contention in the structured language debate, we could all ignore it and go on to more important issues.

This, however, is not the case.

I am an electronics engineer, and my use of computer languages is purely pragmatic; I want the best tool for the job I'm doing right now. Being an engineer has made me aware of the value of my time, and as my familiarity with microcomputers has increased, I have learned that the biggest investment we make in them is not in purchasing them but in programming and using them.

The real point of the structured programming debate then is that a language ought to be organized to keep you from wasting your time fighting mistakes and bugs. Also, it should allow you to create libraries of procedures and programs that you can reuse.

The ideal language for a beginner to learn would be one that encourages structured programming and teaches other useful concepts of software engineering.

Niklaus Wirth designed Pascal to be a teaching language of just that sort. Pascal is strongly *typed*, which means that each variable is declared at the beginning of the program to be of a certain type: character, integer, real, Boolean, or user defined. The compiler or interpreter then checks to make sure variables are used in a way that is consistent with their declaration.

The user may also define complex data types for easier solution of some kinds of problems. The data typing, error checking, and structure of Pascal are all designed to make the computer do more of the work of eliminating errors and avoiding bugs.

When it is 3:00 a.m. and what do my bleary eyes behold but a message from the compiler that I left a semicolon off of line 237, I wonder. I wonder why programmers have done so little to make their own work easier. I know that much of what I type into a program is for the benefit of the computer, and I realize that what I really want is a programming environment that will take the pseudo-code I use to describe program structure and turn it into a working program.

Introducing Alice: The Personal Pascal

Looking Glass Software has granted most of my wishes with Alice: The Personal Pascal. The Alice package con-

By STUART DUDLEY DIMOND III

```

Desk File Edit Structure Run Debug Help Go Misc
File main? Untitled
program Program-Name(input, output);
{Comment that says what the routine does}
var
  x : integer;
  y : integer;

begin
  { ALICE stops you from making syntax errors }
  { because ALICE knows Pascal Intimately }
  { for variable := start to finish do begin
    Statement
    { Just type 'if' on a statement placeholder}
    { and ALICE pops up the 'if' template ! }
    if Condition then begin
      Statement
    end;
  end;
end.

```

Alice programming is done from templates.

tains two unprotected single-sided disks, a tutorial manual, and user a manual. The configuration I use is a 1040ST with a RAM disk just large enough to hold the help files. Alice will, however, run on a 520ST with single-sided disk drive. The programming environment consists of a syntax-directed editor, on-line documentation, an interpreter, and a dynamic debugger.

The Syntax-Directed Editor

Every Pascal program has a lot of overhead that helps to make it intelligible but amounts to unnecessary typing practice for the programmer. The syntax-directed editor "knows" Pascal and is able to enter much of this overhead for you.

When you load Alice, an edit window and an output window appear with the program template already in the edit window. The template looks like this:

```

program Program-Name(input, output);
{Comment that says what the routine does}
Declarations
begin
Statement
end.

```

You begin entering your program by placing the cursor on the Program-Name placeholder and typing the name you are giving the program. When you type at a location occupied by a placeholder, the editor removes it and leaves only what you typed. The Declarations placeholder marks the area where Label, Const, Type, Var, and Procedure declarations for the program are entered. Typing Const and pressing Tab causes Name = Constant; to appear.

Similar templates exist for Label,

```

Desk File Edit Structure Run Debug Help Go Misc
File main? sieve.ap
Frame B/0 in <Program>
1
5
7
11
13
17
19
21
23
29
31
37
Count = 10

```

Users can single-step and examine variables right in the source code.

Alice Pascal is an ideal steppingstone to a higher level of programming skill—like learning to swim in a pool before facing the demands of a dip in the ocean.

Type, and Var, and the template for Procedure is like that for Program. Later when you type a procedure call in the program body, you hit Tab, and the parameter list you declared for the procedure appears automatically.

The editor contains templates for all the reserved words of the Pascal language. You never have to count Begins and Ends, because the editor puts them in their appropriate places when you use a construct that requires them.

A warning is due here for those who are already skilled programmers. During the past year I have spent a great deal of time creating in myself the habits needed to write a program much the way Alice does it. It took me about three days to relax, quit fighting the editor, and let it do the work.

Beginning programmers will have an easier time and will not truly appreciate their good fortune until they have to program with an ordinary editor and a compiler.

Alice maintains a history file as you type, and you can backup instead of deleting by pressing Undo. You can use Redo to restore what you have undone.

One habit I have is giving procedures long names that describe what they do.

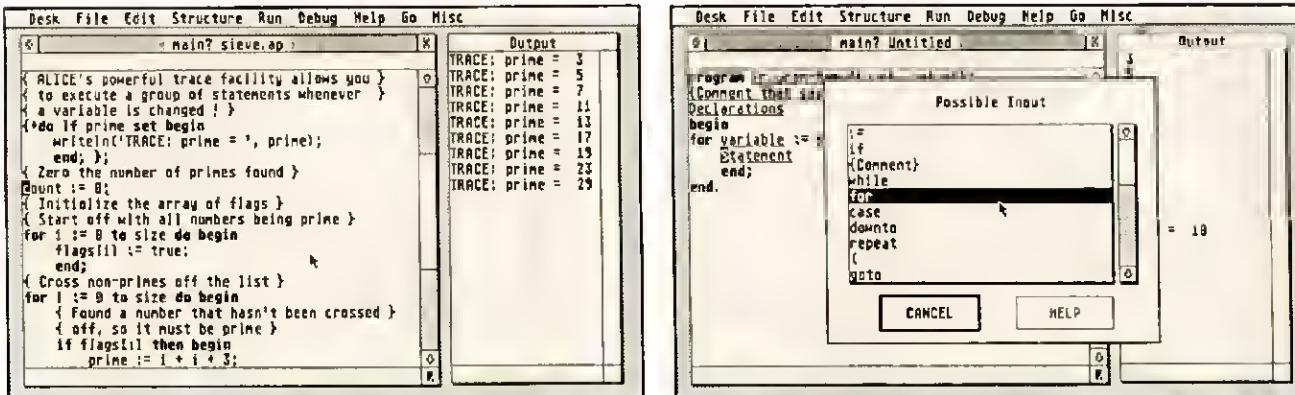
This practice is made easy by the symbol completion function (F3) that fills in the rest of a symbol when enough has been typed to identify it. There are also commands to hide blocks of code out of sight except for a comment describing what they do. This is a feature I would be reluctant to use except in a very long program for which I needed hardcopy to convey the sense of the program without the details. Alice lacks a print command, so you must save a program as text and use a word processor to print the file, if you want a listing.

Dynamic Help

The dynamic help facility of Alice is immediately at hand as you enter a program. Instead of reaching for the Pascal reference manual or textbook, press the Help key, and you will be presented with a menu of help screens related to the context of the current cursor position. The 700 help screens alone will save beginners many hours.

For example, What Can I Type will display a list of possible entries at the cursor, and Help On Last Error will tell you about your most recent mistake. Command Help summons a summary of Alice commands.

PROGRAMMING



Any change to any variable can be traced with user-written code.

Alice permits programming to be done almost entirely from menus.

The Interpreter

When you have entered your program, you can run it by dropping the menu and selecting Run, by pressing F1, or by entering the Run command on the command line. If you have problems, several excellent built-in features are available to facilitate testing and debugging.

The Single Step mode, for example, permits you to step through the program following the cursor from one instruction to the next. If you have a FOR, WHILE, or REPEAT loop, the Super Step mode will execute all the iterations of the loop as one step.

Output can be logged to an output file by using the Log Output command, and variables can be examined during execution by using the Immediate mode. Breakpoints can be set for debugging, and an extremely handy feature called Who Called Me can be used to track back from a procedure through a sequence of calling procedures. This can be a sanity saver when tracking bugs in a large program where a procedure may be called by any of several other procedures.

GEM Interface

The simplified GEM interface that is included in Alice will be useful to beginners. It allows you to create windows and graphics even if you don't have a detailed knowledge of the guts of GEM.

For example, AES routines that allow you to display multiple windows of variable size complete with titles and scroll bars are provided, and simplified graphics support offers five different coordinate systems, two of which provide Turbo Pascal compatibility. A

good balance has been struck here to allow the less experienced programmer access to some of the most enjoyable

capabilities of the ST without requiring him to become a programming wizard.

The more sophisticated programmer

More About Pascal

If you want to learn more about Pascal programming, try one or more of the books on the following list.

Alice Educator is a Pascal textbook written to complement the Alice software package. If you are a beginning programmer and want to learn Pascal well enough to write programs occasionally, *Alice Educator* will guide you to the level of skill you wish to achieve. The book contains a gentle introduction to the world of microcomputers and explanations of the theory of various aspects of computing as well as the more specific material on Alice and Pascal.

There are not as many examples as I like to see in a book for beginners, and some important topics are given only a theoretical discussion. Recursion is an example of one such topic that is treated this way. *Alice Educator* also neglects to introduce the student to the Backus-Naur Formalism syntax charts that so elegantly convey the syntax of Pascal.

For the person who already has programming experience or for the beginner who wants become really proficient, I recommend *Oh! Pascal!* by Cooper and Clancy or *Problem Solving and Structured Programming in Pascal* by Koffman. These

are books intended for introductory college courses in Pascal and will provide a foundation on which to build serious software engineering skills.

Oh! Pascal! in particular contains a wide variety of programming examples that you can study, and the authors have injected enough humor to lighten the task of learning the language.

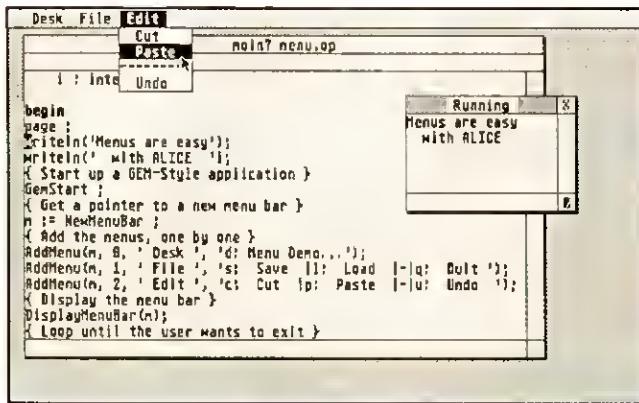
For the skilled programmer, *Standard Pascal: User Reference Manual* by Cooper may be all that is necessary. It is a complete description of the ISO Pascal Standard and comes with a handy programmer's reference card with all of Pascal presented in BNF syntax charts.

• *Alice Educator: The Preferred Way to Learn Pascal*, Looking Glass Software, Waterloo, ON.

• *Problem Solving and Structured Programming in Pascal*, Elliot B. Koffman, Addison-Wesley Publishing Company, Inc., Reading, MA.

• *Oh! Pascal!*, Doug Cooper and Michael Clancy, W.W. Norton & Company, New York, NY.

• *Standard Pascal: User Reference Manual*, Doug Cooper, W.W. Norton & Company, New York, NY.



An example of creating a menu bar.

will appreciate the library of procedures that allow him to make use of many of the VDI functions. Calls to GEMDOS and the BIOS and XBIOS are supported through the CPROC procedure.

One thing that Alice does lack is a Resource Construction Set.

Documentation

It is the nature of programming languages that they can do more than can be documented by any reasonable effort. The documentation with Alice assumes a knowledge of Pascal, so if you have not yet learned the language, see the sidebar on Pascal textbooks.

The tutorial is a clear introduction with a step-by-step progression through the process of writing, running, and debugging a program. The user's guide gives a more detailed description of the features and describes the GEM interface.

The GEM material is sufficient for those who are satisfied with the simplified interface. If you want to go deeper and use the library of VDI calls, however, you will have to find further documentation in other sources.

The on-line documentation for Alice is so extensive that after a short start-up period you may never have to refer to the tutorial or user's manual again.

Among the goodies you will find on the disk is a folder of sample programs. These give examples showing how to use the simplified graphic interface, how to display a file selection box, how to create a menu, and other useful tidbits to get you started.

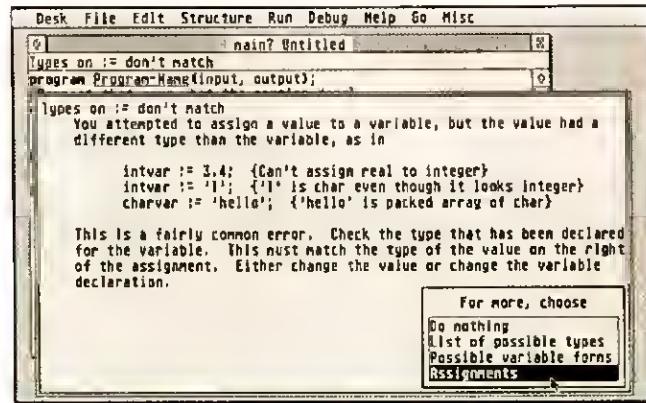
Another folder contains two large example programs—an inventory program and a painting program. The folders Techtips and Libs contain tips and the CPROC routine that permits access to the GEMDOS, BIOS, and XBIOS calls.

Who Should Buy Alice?

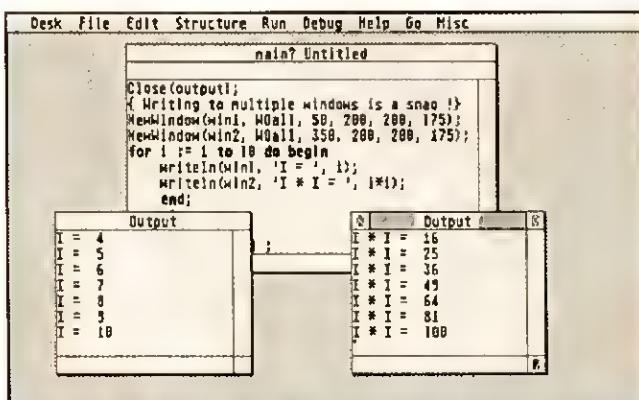
Alice is ideal for beginning programmers—a much better foundation for further learning than Basic. Even if you never attempt to move on to a higher level of programming skill, this package is worth having; it will make the time you spend programming less frustrating, more productive, and more fun.

If you have programmed in Basic and are thinking of buying the Atari developer's kit or a C or Modula-2 compiler, Alice is an ideal steppingstone to a higher level of programming skill—like learning to swim in a pool before facing the demands of a dip in the ocean. And the Turbo Pascal-compatible mode makes it possible to write programs to use at school or work on a PC clone.

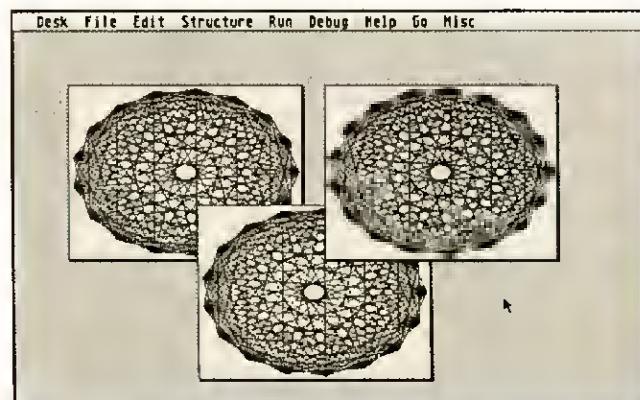
As a programming environment for both beginners and advanced users, Alice is an outstanding effort. The skill and thoroughness applied to the creation of this software package impressed me greatly. Now, if someone will just write a word processor that will turn an outline into a finished article. ■



A help screen exists for every error message.



A new GEM Interface allows simple programs to use windows.



All graphics are done in GEM windows without extra work by the programmer.

Tackle Box

A new utility from SRM allows Personal Pascal programmers to conform to the C style of programming on the ST

If you use, have used, or are considering using the Personal Pascal programming language from Optimized Software Systems (OSS) for the Atari ST, you should know about SRM Enterprises' *Tackle Box*.

Modestly described as "a utility for tackling your Personal Pascal problems," this manual/software combination contains reams of information every Personal Pascal programmer can use to take full advantage of the power of the ST.

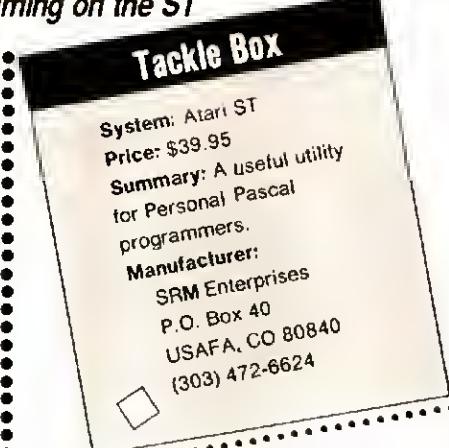
What can *Tackle Box* do for you? Before I tell you that, I should first explain a few things about Personal Pascal (which happens to be my favorite Pascal compiler for the ST).

Background

Introduced by OSS early in 1986, Personal Pascal offers a Spartan but by no means unfriendly programming environment. While adhering closely to the ISO Pascal standard for syntax, Personal Pascal incorporates a substantial number of calls to the TOS operating system, providing easy access to such standard GEM features as windows, menus, and dialog and alert boxes.

Those features that are included are reasonably well documented. However, the Personal Pascal implementation of GEM is incomplete, and most programmers are eventually forced to resort to outside references (often several are required) and inelegant AES_Call and VDI_Call constructs to achieve their goals. Almost totally ignored by the Personal Pascal documentation are the GEMBIOS, XBIOS, and BIOS subsystems required for such basic system functions as file maintenance.

Unfortunately for Pascal programmers, the ST operating system is orient-



ed to the C programming language, and until now, conversion of C programs for the ST to Personal Pascal has been a tricky proposition. In converting many of the system calls to a format suitable for Pascal programming, the designers of Personal Pascal changed the "standard" order of parameters and renamed the calls. In some cases several C calls have been combined into a single Pascal call, and while this makes the Personal Pascal programmer's life simpler for the most part, it can lead to communication problems with other ST programmers.

What *Tackle Box* does in a nutshell is to permit Personal Pascal programmers to conform much more closely to the C style of programming on the Atari ST. Specifically, it provides easy access to the "C-standard" names and formats for all system calls, including those to the GEMDOS, BIOS, XBIOS, VDI, and AES. This eases tremendously the task of converting C programs for compilation by Personal Pascal; only the syntax need be altered, and all system

calls can be used intact.

Tackle Box also includes a disassembler and an extensive math library. While the former wasn't available in time for this review, the latter is most impressive—by itself well worth the purchase price. And as a bonus, an extra disk comes crammed with well-commented sample source code and compiled programs.

Documentation

The 421-page *Tackle Box* manual documents fully every single system call available to you in the ST operating system. The information is clearly presented, well-organized, and coherent.

Following the introduction are two pages of instructions that begin, "The installation of *Tackle Box* is a very straightforward procedure." Surprisingly, this is absolutely true. The two pages of instructions are more than adequate, especially given the detailed descriptions of all system calls that make up the bulk of the manual.

The main body of the documentation is divided into sections, each of which describes one of the components of TOS: GEMDOS, BIOS, XBIOS, VDI, and AES. Within each section descriptions of system calls are laid out conveniently; each one starts at the top of a new page, and quite a few extend over several pages.

The first line of each entry consists of the decimal opcode, a brief description, and a key word that gives the standard C function call name. The next line shows the type of call (function or procedure) and the data type of the returned value, if any. Next comes an English-language description of the purpose of the call, complete with references to other relevant calls.

Then the method required to use the call is presented along with complete descriptions of all required parameters and returned values. Next, restrictions are described, followed by the Implementation, which lists any variables that must be declared and gives a brief example of the use of the routine in a program. In many cases, a more detailed example is also provided.

By including the provided header files, you can call all of these routines according to the standard C format, using names like `Mallo()`, `Fsfirst()`, and `Getrez`.

The section that deals with the Virtu-

By DAVID DUBERMAN

al Device Interface divides the VDI routines into 11 libraries: Workstation, Polyline, Polymarker, Text, Graphic, Fill, Input, Inquire, Raster, Exchange, and Mouse.

The section begins with a brief discussion of such GEM programming concepts as device coordinates, workstations, angles, polymarkers, raster operations, writing modes, and character cells. Next come detailed instructions on accessing the VDI from Personal Pascal, followed by 100 pages of documentation of the calls themselves with examples of Pascal and C-style implementations in all cases. A section on GDOS is not included, but will be added shortly.

The 109-page documentation of the Application Environment Services (AES) routines is equally extensive. Again, we find 11 libraries: Applications, Event management, Menus, Objects, Forms, Graphics, Serap, File Selector, Window management, Resource, and Shell. A more or less detailed discussion of the programming each call description is the same as that

Until now, conversion of C programs for the ST to Personal Pascal has been a tricky proposition.

principles involved precedes the list of calls for each library. The format of used in the VDI section, and Pascal and C-style examples are provided.

The math library includes 14 trigonometric functions, five power/logarithmic functions, and base conversions of numbers from and to binary, octal, decimal, and hexadecimal. Additionally, there are three sound and two time/date functions.

A final miscellaneous category includes functions to convert data between strings and real numbers, and between Pascal strings and C strings. Also included are routines to get the addresses of memory parameter blocks, procedures, the screen, C-type strings, and memory form definition blocks, and implementations of PEEK and POKE. An

appendix includes TOS and Personal Pascal error codes, opeodes and page references for all system and *Tackle Box* calls, an 11-page glossary and the index.

The five example programs on the second disk are of great instructional value for the budding Personal Pascal programmer. Together they constitute over 180K of well-commented source code. Two of them, Quick TOS and VDI Help, come in the form of desk accessories, and the other three, Easy Sound, Mouse Form, and Dialer, are desktop programs. Compiled versions are also included.

I can't overemphasize that at a suggested retail price of \$39.95 *Tackle Box* is an incredible value and a must buy for all Personal Pascal programmers. ■

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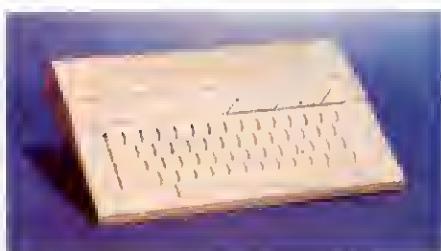
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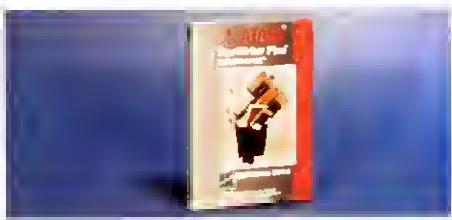
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Survey



Guild Of Thieves

System: Atari ST
(color or monochrome)

Price: \$44.95
Summary: Not very
amusing graphic/
text adventure

Manufacturer:
Firebird
P.O. Box 48
Ramsey, NJ 07446
(201) 934-7373

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

Anthropologists and linguists tell us that one of the most difficult things to transfer from one culture to another is humor. My experience with *Guild of Thieves* confirms that even two such similar peoples as the British and the Americans, with their shared heritage and language, laugh at different things.

Guild Of Thieves is from Firebird, the folks who gave us *The Pawn*, and is supposed to be both a witty and a worthy successor. Unfortunately, I can't find cause to say "aye" on either count.

The first indication that something strange, but not necessarily funny, is going on comes right at the beginning of the game. There is no way to get from the boat to the shore without falling in the water; there are eight different directions you can go, and all end with you in the drink. Only after trying all eight will the *Guild of Thieves* master become tired of your splashing about and

throw you onto dry land.

In the 40-page instruction manual, which reads like a script from a bad Monty Python dream, there is a section (14 pages) of what are called *Guild Of Thieves* cheat-sheets. The first item on the sheet is titled "How Do I Get Out of the Boat?" You get an idea where this game is headed when you find you need cheat-sheet help to accomplish the first minor task.

But that's just the beginning. How does the cheat-sheet answer the big No. 1 question? The solution is over 120 letters and numbers that must be typed in exactly as they appear on the sheet. Good grief!

As in *The Pawn*, the graphics are very nice and handled in pull-down fashion. Also as in *The Pawn*, the adventure takes place in the kingdom of Kerovnia.

The moral of this story could be something like this: "To steal is necessary; to get away with it divine"—prob-

ably not the message we want the youth of America to carry next to their hearts, but then I'm sure nothing about this game is meant to be taken seriously.

All movement is accomplished by typing commands, and the parser leaves quite a bit to be desired. I'd be willing to bet that the person who did the graphics and the one who designed the parser don't even know each other by name. There are items distinctly drawn on the screen the names of which the parser doesn't recognize. In the billiard room, for example, there appear to be two windows on one wall. The text description makes no mention of them, and when you try to look out the window, the game tells you that there are none.

This is probably just another example of British humor. But I didn't wait around for the punchline.

—Rick Teverbaugh

Driving on an interstate highway can be a harrowing experience, and there are times when I wish I had an arsenal of James Bond-type weapons to clear a path to my destination. SSI offers us just such an opportunity in their futuristic role-playing battle, *Roadwar 2000*.

Your role is that of leader of a road gang that has been asked by the government to locate a group of scientists and bring them to a secret lab where they can develop a vaccine to neutralize deadly microbes.

In scenes reminiscent of movies like "Road Warrior" and "Death Race 2000," you and your gang must scratch and claw your way across a land that has been ravaged by nuclear and biological warfare, and your survival is anything but assured. Looting, shooting, and ramming with your vehicle are all easily justifiable behaviors; of course, you must remember that rival gangs possess the same weapons and will not hesitate to use them against you.

You will find yourself frequently mourning the loss of your compatriots until you start to learn the strategy required for success in this complex adventure. Among other things, you will

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST (color)

Price: \$39.95

Summary: Futuristic conflict on the highway.

Manufacturer:

Strategic Simulations
1046 N. Rengstorff Ave.
Mountain View, CA 94043
(415) 964-1353

Roadwar 2000

learn that you must stash supplies for later use in the cities through which you trek; ample raw materials are the key to keeping a sizable band on the move and in good health.

It took me a while to catch on, and at first I had trouble getting a good enough start to keep a game going. Frequent



saves help, but you will find yourself regularly "resurrecting" your gang.

Compared with the difficulty of keeping my group going, my other problem was minor. The graphics throughout the game are well done, but the icon that represents your convoy can get lost amid the cities, mountains, and other onscreen terrain. This is most troubling when you are learning the game, and you do get used to it as you gain experience.

All in all, I found *Roadwar 2000* to be a clean portrayal. It is an entertaining, if somewhat complex, bit of escapism that most SSI fans will enjoy.

—Andy Eddy

Atarians haven't heard much from game guru Chris Crawford in recent years, but I'm sure most serious gamers will agree that his latest release, *Balance of Power*, was worth waiting for.

Balance of Power puts you in the White House or the Kremlin and gives you the power to make decisions with global consequences. Your goal is to win the respect of the other countries in the world, either by lavishing military and economic support on their leaders or by assisting the subversive elements of their society in the same manner (thereby causing the overthrow of the current hostile regime).

Anything you do is subject to the in-

tense scrutiny of your counterpart in the US or the USSR, and in your quest for geopolitical prestige, you are bound to make some moves that will displease your opponent. In responding to his actions, you can choose to back down or escalate to the next stage and precipitate a diplomatic crisis.

In a diplomatic crisis, one side or the other will lose prestige by backing

Balance Of Power

System: Atari ST (monochrome or color)

Price: \$49.95

Summary:
A serious lesson in detente

Manufacturer:
Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
(800) 221-9884
(312) 480-7667

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

down. If neither side backs down, the result is a military crisis. The two possible outcomes of a military crisis are a major diplomatic defeat for one side or a nuclear war in which both sides lose.

One of the introductory screens advises that "people who attempt to play this game without reading the manual are wasting their time." Fortunately, the 88-page manual is readable as well as informative, so familiarizing yourself with the mechanics and assumptions of the game is not a chore.

Balance of Power offers four levels of play—beginner, intermediate, expert, and nightmare—and one- and two-player options.

Even at the beginner level, the only thing easy about *Balance of Power* is the mouse-controlled interface. You can point-and-click on a country to reveal the stability of its government, the political leanings of its leaders, and other important facts, or you can pull down menus to gather vital data about US and Soviet commitments throughout the world.

Balance of Power is not for the casual gamer; it requires a significant investment of time and intellectual effort and a real willingness to learn how a larger and much more important game is played.

—Andy Eddy



Q-Ball is a 3-D take-off on a billiards contest. It is played within a cube that has a pocket at each corner—a strange spatial representation that takes some getting used to. To aid in viewing the cube, you can rotate it in any direction (using the arrow keys), just as you would walk around a pool table to find your best shot.

The goal (for one or two players) is to pocket the six red balls that appear on-screen at the start of play. With each red ball sunk, you get a shot at the yellow ball for bonus points. Points are scored for sinking balls in the pockets and for striking them straight on, and large point deductions are weighed for scratching (sinking the black cue ball) and for hitting or sinking the wrong ball.

These tasks are quite difficult, and given the arena you are playing in, the entire game can be extremely unnerving. The other factor that restricts your relaxation in gameplay is the 60-second timer that forces you to take a shot at the end of one minute, ready or not. Time is also factored into your score, so dawdling isn't recommended.

Even if you get the hang of the various control keys and their functions (a reference card is provided), the intricacies of *Q-Ball* are very difficult to master. I had particular problems aiming

Q-Ball

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST (color)

Price: \$29.95

Summary: Twisted billiards take-off

Manufacturer:

Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
(312) 480-7667



the cue ball and rotating the playfield.

A "shadow" image of the cue ball acts as a cursor, showing where the ball will hit another ball. Sometimes it is nearly impossible to get it set up where you want it—especially with the time limit looming over you.

With regard to rotation, I don't understand why *Q-Ball* lets you fine scroll on the horizontal axis, but permits only 90-degree spins on the vertical axis; precision targeting is somewhat impaired because of this.

Q-Ball is a quirky, twisted concept that will attract those who like their games weird. For others, it will be a nightmare come true—though you can turn this one off.

—Andy Eddy

Ever since I played the first Roger Damon wargame back in 1983, I have been entranced with the superb graphics and playability of this author's games. His first game, *Operation Whirlwind* from Broderbund, did much to attract gamers who were simply not ready to deal with the heavy gaming represented by the majority of wargames on the market. Damon's system made it possible for even the uninitiated to latch onto a platoon of panzers and roll on down the road without plowing through voluminous rule books.

Now, with the recent release of *Wargame Construction Set*, Damon has allowed his enthusiastic followers to create their own unique scenarios, in one- and two-player versions, and from whatever period in history they prefer.

In most cases, using the joystick, you will begin by choosing Draw Map from the main menu. You can choose one of nine scenarios and alter it or create your own terrain and battle conditions.

Wargame Construction Set comes stocked with every type of terrain from roads, rivers, and forests to mines, bridges, and buildings. In addition, the program offers a seemingly endless selection of 78 different icons represent-

Wargame Construction Set

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari 8-bit computers

Price: \$29.95

Summary: Creative fun for wargame enthusiasts.

Manufacturer:

Strategic Simulations, Inc.
1045 N. Rengstorff Ave.
Mountain View, CA 94043
(415) 964-1353



ing everything from tanks, infantry, and helicopters to ancient Romans and archers. There are also a few futuristic aircraft suitable for fantasy and science fiction scenarios. Each unit can be edited to give it the qualities of attack or defense you desire.

By far the most rewarding feature of the package is the ease with which you can develop the terrain map. Your maximum working area is just under two screens wide and close to three deep.

The terrain icons consist of roads, riv-

Goldrunner

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST

Price: \$39.95

Summary: Well-designed arcade game with great graphics

Manufacturer:

MichTron

576 S. Telegraph
Pontiac, MI 48053
(313) 334-5700



What is refreshing is how clean the movement and graphics are. Its displays are richly painted with pastel colors; the background scenery is sharply detailed, displaying machinery and other graphics that have no real purpose in the game except to distract your attention from the targets you are supposed to destroy. And distract they do!

The game is set in the Ringworlds of Triton, and your targets are strewn about the "rings." Your mission is complicated by the guard ships that frequently cross your path. The ships themselves pose no problem, because you can't crash into them, but they leave "disrupter bombs"—tricky little mines that seem to follow you—in their wake. If one of them hits you, the power of your armor shields will be eroded. Care must be taken to guard your craft; you get only three ships, and no bonus ships are given to prolong the battle.

When your mission is accomplished, you exit the ring by flying through the main portal, which may be located on the other side of the ring in which you find yourself, forcing you to traverse a great distance before you depart. Added to the action are bonus screens that reward each successful attack.

Only two negative thoughts come to mind: First, there are many rings to work through in *Goldrunner*, but it appears that the sequence repeats after every four. Once you have devised a strategy for those, you should be able to work your way well into the contest.

Second, as the game wears on you are encouraged by digitized cheerleading. This can become annoying after a while—because of both its frequency and its clarity. (*ST-Replay*, another MichTron product was used to create these digitized effects.) Thankfully, these shortcomings don't seriously diminish your enjoyment of the game.

Goldrunner poses a tough challenge, but it is still a fun game, and so far has my vote for best arcade game of 1987. I'm looking forward to more programs from the MicroDeal arm of MichTron in the future.

—Andy Eddy

ers, hilltops, crests, buildings, woods, mines, bridges, and objectives. You can also alter the color of the terrain to suit the scenario. The only problem is that this color function also alters the unit icons, so you have to be careful not to alter the ones you want to use too much.

By far the most important aspect of the game is how you define the capabilities of both friendly and enemy units. Fine-tuning their relative strengths can be quite a delicate operation if you want the result to emulate historical events. You do, however, have plenty of time to test and retest the results, and if you find things going too well for the enemy, you can simply go back to the drawing board and alter his aggressiveness or firepower slightly. Anything is possible with this game system, but small tactical scenarios seem to suit it best.

SSI reports that there was a bug in the Scale function of some of the early shipments of the package. The problem has been eliminated, however, and SSI advises that defective disks can be returned for replacement.

All in all, *Wargame Construction Set* is a fine product that will do much to entice novice wargamers into the fold.

—George Bradford

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Hardball

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST

Price: \$39.95

Summary: Arcade-style baseball simulation

Manufacturer:

Accolade

20813 Stevens Creek
Cupertino, CA 95014
(408) 446-5757



As you have probably already noticed if you looked at the "report cards" for these two games, I think that in the realm of baseball simulations *Hardball* is superior to *Championship Baseball*. But rather than merely trashing the Gamestar effort, I want to start by pointing out a couple of lessons the designers of *Hardball* could learn from the designers of *Championship Baseball*.

With *Hardball*, you must use the fictional teams (and there are only two) that are included on the disk. Also, when the game is over, it's over. I know that's what Yogi Berra has taught us to expect, but let me explain.

Other than the pure enjoyment of playing *Hardball*, there is nothing to keep you coming back for more. With

Championship Baseball, it is possible to create your own teams with names of real-life players, family members, friends, enemies, or whatever. Also there are standings to keep, divisions to be won, and playoffs to be played. These are all elements of baseball that *Championship Baseball* treats adequately and *Hardball* ignores.

But when it comes to the essence of the game—what really goes on after the ump hollers "Play ball!"—*Hardball* doesn't really have any competition.

Hardball can be played with one or two players. The one-player version makes use of the mouse as a controller. At first I was a bit reluctant to use it; other games had convinced me that the mouse was not the controller of choice in a realtime action setting. But the

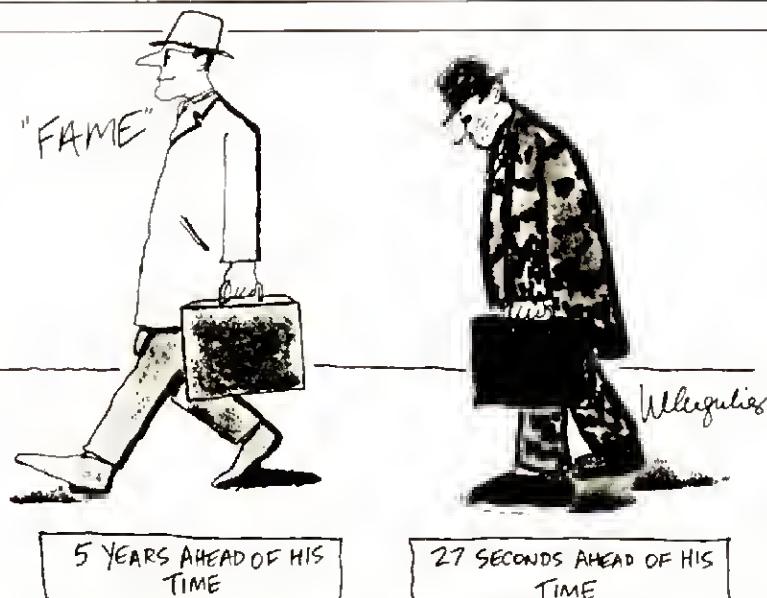
team that integrated the mouse into *Hardball* gets my nomination for the "Golden Cheese" award; they did a great job.

In the field it seems quite natural to use the mouse to move the player toward the ball. Once the ball is fielded you are automatically in the mode to throw the ball (in *Championship Baseball* another tap of the joystick button is necessary before you can throw). A quick slide of the mouse in one of four directions designates the base to which the ball will be thrown, and a tap of the button sends it on its way.

A similar sequence controls runners on base when your team is at bat. *Hardball* also offers many more strategic options than its competitor. It is possible to bring the infield in or put them at double play depth, shift the outfield to the left or right, or intentionally walk a hitter.

Eight different pitches are available in the game, though no single hurler can have more than four in his arsenal. The eight are fastball!, fastball, offspeed, change-up, curve, screwball, sinker, and slider. There are also nine different pitching zones. One is right down the middle (always a strike). Four others—high, low, inside, and outside—have a high probability of being a strike. And the other four—low outside, low inside, high outside, and high inside—almost never result in a strike.

It becomes a crucial part of the game to plot a pitching strategy based on the pitches your hurler has at his disposal and to set up each hitter. Fall behind early in the count and you'll need to deliver a fast pitch. At the plate, if you get ahead in the count you can look for a



Championship Baseball

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

GRAPHICS

System: Atari ST

Price: \$34.95

Summary: Arcade-style baseball simulation

Manufacturer:

Gamestar

P.O. Box 7287

Mountain View, CA 94039

(415) 960-0410

particular pitch or a pitch in a particular zone and drive it. At bat the swings can be in any one of the same nine zones toward which the pitcher throws.

Championship Baseball also offers eight pitches, but two of them, the fast ball and change up, can only be thrown right down the middle. Others can be thrown only to certain other locations, so the pitcher is really limited to eight options, whereas the player of *Hardball* has 36.

The graphics, too, are miles apart. *Championship Baseball* uses a split screen. The right half is devoted to a close-up of the pitcher/batter confrontation. The left half shows the entire playing field from a vantage point high above the first base dugout. But the graphics are cartoon-like. What's even more dismal is the manner in which these characters run around the field chasing the ball like a handful of Little Leaguers.

The graphics in *Hardball* have better definition. The display is three-fold, but only one aspect is displayed at a time. For the batter/pitcher battle, the shot from the center field camera familiar to TV viewers is shown. When the ball is hit, either the left- or right-hand side of the field is shown from the home plate perspective. Therefore, the center field is slightly compressed and appears to be no further away than the left or right, but this is only a minor annoyance.

Overall, neither program is a perfect simulation. But it is obvious after only a couple of games, which will have the longer shelf life. My money is on *Hardball*.

—Rick Teverbaugh

I'm not the world's biggest fan of text adventures, especially on a computer with the graphic capabilities of the ST—it generally seems a waste.

On the other hand, I work in words and not pictures. As one writer to another, I applaud author Steve Meretzky for visual images that make me forget that my brain is absorbing "mere words" and a story line so absorbing that I have to call my wife to turn the game off for me when it's time to go to bed.

The *Stationfall* story actually begins with *Planetfall*, a game that features Floyd the robot, one of the most disarming characters ever to romp through an adventure game. *Planetfall*, is set 12,000 years in the future and puts the gamer in the role of a Stellar Patrolman who has been yearning for action away from his trusty mop.

It isn't necessary to have played *Planetfall* to enjoy *Stationfall*, but it really does help. The protagonist is the same Stellar Patrolman, but he has earned a promotion for his success in the earlier adventure.

Instead of Ensign Seventh Class, you are now Lieutenant First Class. But for the past five years, you have spent most of your time pushing papers instead of mops, and the next assignment appears to be more of the same: the folks at Space Station Gamma Delta Gamma 777-G 59/59 Sector Alpha-Mu-79 (I love that kind of talk) need some black form binders.

The excellent parser is exactly what we have come to expect from Infocom, and it isn't difficult to communicate with the computer to accomplish almost any task you have in mind. Figuring out what should be done and when is a bigger challenge.

Infocom tries to help you along the

Stationfall

PLAYABILITY

CHALLENGE

ADDICTIVENESS

EASE OF LEARNING

System: Atari ST (color or monochrome)

Price: \$34.95

Summary: Space text adventure

Manufacturer:

Infocom

125 Cambridge Park Dr.
Cambridge, MA 02140

(800) 262-6868

way with various hardcopy tutorials, but this time I think they may have overdone it. In addition to the official technical manual, there are ten Stellar Patrol of the Third Galactic Union official blueprints, an assignment completion form, a robot use authorization form, and a class three spacecraft activation form. If you can spend a day covering and digesting all this material, you will probably be ready to play the game on the second day.

But once you get started, you will find *Stationfall* to be a worthy successor to *Planetfall* and in almost every way a fine addition to your text game library.

—Rick Teverbaugh



A few weeks ago, I was listening to a music educator friend lament the state-of-the-art in computer-aided instruction (CAI) for music.

"John," he said, "you know Samuel Johnson once said that 'a woman playing a piano is like a dancing dog. It's not done well, but one is amazed to see it done at all.' These days, I'd be amazed to see anything being done at all in computer-based music instruction software. And the ironic thing is that computers and music have never been better integrated than they are today."

"What with MIDI (the Musical Instrument Digital Interface that permits computers and keyboard instruments to communicate electronically, built into Atari ST computers) and all, there is incredible opportunity for really great, interactive music instruction software. But I see nothing, nothing, nothing but trivia. Nothing that will hold a student's interest or teach him what he really needs to know, much less take advantage of the hardware."

I used to think the same thing—that state-of-the-art, MIDI-equipped, high-performance personal computers were the ideal delivery systems for music education software. Maybe so, but since reviewing *Atarimusic I and II*, Atari's own music theory instruction programs for the 8-bit systems, I'm not so sure.

First released in 1983 and designed to operate within the constraints imposed by 24K of RAM on 8-bit, MIDI-less technology, these programs nevertheless constitute the best-thought-out, most beautifully put together CAI programs I've ever seen . . . in any subject.

Atarimusic I and II, otherwise known as the Atari Music Learning Series, were developed by Dr. Fred T. Hofstetter, professor of music and education and founder of the Office of Computer-Aided Instruction at the University of Delaware. The programs form a curriculum that takes the budding musician through basic note-reading, steps and intervals, scales, and key signatures, and into the realms of scalewise melody and solfègegio.

The Problem of Early Music Training

In the first stages of musical education, students are engaged in discovering, informing, testing, and developing their ability to deal with the complex symbolic language of musical notation. At the same time, they are striving to relate this new skill to the intuitive experience of hearing sound and the kinesthetic experience of producing it.

The process of learning music theory is always tedious and sometimes pain-

ful—particularly for students who are already competent instrumentalists.

Whenever talent and pleasure submit to discipline, much is at risk. If the musician is to continue to grow in his art, he is absolutely obliged to master this material. Yet if he is to continue to enjoy his art, he must be permitted to do so without developing a sense of failure in the process.

It is hardly surprising, therefore, that musicians remember their first theory instructors keenly—whether for good or ill—and that they commonly trace the origin of their most profound fascination in or their deepest conflicts with their art to this early period of education.

Atarimusic I and II seem to have been designed in full understanding both of the critical nature of the subject matter and the vulnerability of music students at this stage of instruction.

Working With the Program

Each package is divided into two sections, each on its own disk. Both disks are bootable, and each is "aware" of the contents of the other, so that a uniform main menu for the entire package can be supported.

From this main menu, which appears when either disk is booted, you can select one of the two major topics. If the topic selected is not resident on the boot disk, one of two things happens. On a two-drive system, where the other disk is resident on the second drive, the selected topic is loaded without further intervention. On a one-drive system you are given concise instructions for swapping disks.

By this simple, careful, uniform approach to bootup and disk handling, the packages not only de-emphasize the compromises that have had to be made in supporting the limited 24K technology (the fact that each package is spread over two disks, comprising a variety of "chained" modules), but manage to de-emphasize the technology itself—a vital courtesy to the computer neophyte.

On the other hand, *Atarimusic I and II* do not fall into the trap of completely denying their nature, giving you too little information to deal with the realities of instruction in the computer medium. As a single example, when lesson modules are being swapped in and out in the course of running the program, you are prompted like this: "The Atari is now loading Major Scales . . . Please wait."

The subtlety of this prompt is worth examining in detail. Note that, with a few words on the screen, you are re-

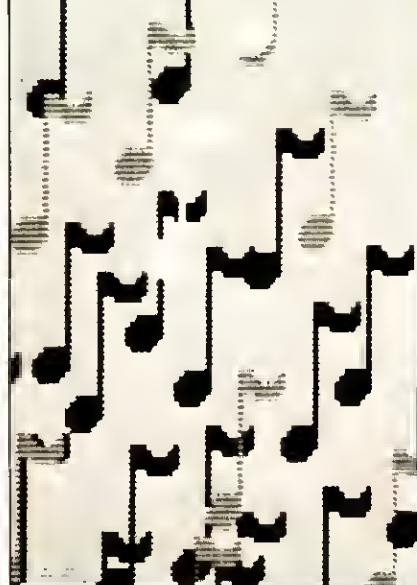
Atarimusic I and II:

State-of-the-art CAI

for music theory . . .

no MIDI required!

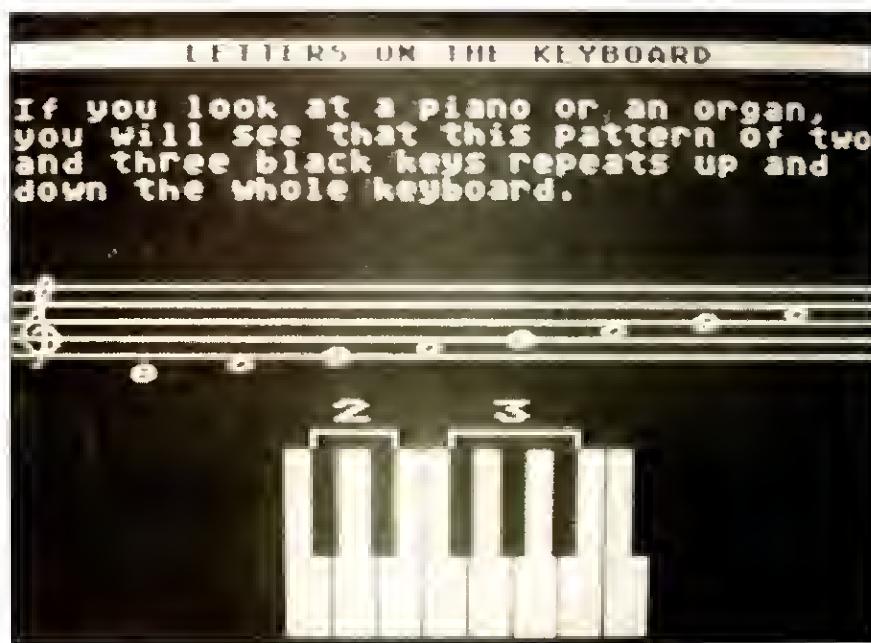
Sound Chip



By JOHN JAINSCHIGG

minded that you are interacting with a computer and told to wait while the computer does its thing. During the interval, you are also reminded of your ultimate destination in the lesson plan, so that you are ready to begin the lesson when it appears.

Beneath each major heading in the menu are subtopics, each further divided into sub-subtopics. The apparent topology of the package is thus much like a tree; you can (by using the Select key to highlight the topic of your choice at each level and the Start key to activate it) move down to any desired "branch" for review or pick up from where you left off at the end of a prior session. To move back up the tree from level to level, you simply press the Esc key at any point. Pressing Esc as few as three times will return you to the main menu regardless of how far down you have gone.



While the tree topology and its simple controls facilitate the process of selecting a starting point within the curriculum of a section, once you have actually begun studying, an even simpler, "linear" set of controls comes into play. When you have finished reading a page or performing an activity, you can go on to the next by pressing Return. The Delete/Bk Sp key moves you back one page, permitting review. All the subsections under a major section are chained together and subject to these simple controls for forward and backward movement.

New modules are loaded automatically when one section is completed, providing an uninterrupted learning experience that emphasizes the fact that each lesson builds on the material presented before it.

In summary, you can navigate the package both vertically and horizontally, using no more than four keys. I can hardly imagine a user interface that would be easier to handle and more forgiving of error.

Atarimusic I and II

System: Atari 8-bit

Price: \$24.95 each

Summary: Excellent interactive course
in beginning music theory.

Manufacturer:

Atari Corp.
P.O. Box 61657
Sunnyvale, CA 94088
(408)745-2367

All interactive exercises are beautifully presented, using sound and color graphics, and emphasizing use of the joystick wherever possible.

Content

Each subtopic in a section reflects a single, small, coherent unit of information relating to a single subject. Within the subtopic, information is presented by pages, built up fact-by-fact, and illustration-by-illustration, as you interact with the material. This approach gives you a sense of collaboration with the machine in the "creation" of the lesson at hand. Consistent with the theory of programmed instruction, you need absorb only one or two sentences worth of information between interactions.

Though pages are built up incrementally as you move forward, pressing the Delete/Bk Sp key reveals that backward movement proceeds by pages, not unrelated facts. Thus in review, you are constrained to treat each unit of information as a totality. The result is to create the sensation of progress in your mind. In a sense, though you are free to review at any time, you are not permitted to move backward as easily as you can move forward.

A typical subtopic consists of seven to ten pages of facts and illustrations, broken up by practice activities and concluding with a quiz. Some of the activities are open-ended—that is, you can

work with them for any length of time until you become familiar with the information they cover. Others are demonstrative—designed to be worked through once before proceeding.

Many are presented in both formats—activities used initially as demonstrations will often re-appear as open-ended activities or quizzes later on (usually in somewhat more sophisticated form). You can thus become familiar with all aspects of an activity in a non-judgmental context, before your performance is evaluated.

Programming and educational savvy run very deep in this material. All interactive exercises are beautifully presented, using sound and color graphics, and emphasizing use of the joystick wherever possible. The pacing of activities is moderate; delays are inserted to keep you from feeling that you are being battered with questions at the computer's ultimate speed. All interactions with the

machine occur very much in gentle human scale.

The exercises, activities, and quizzes in *Atarimusic I and II* are designed to be "error free." You are congratulated for correct responses and, in case of a mistake, corrected nonjudgmentally.

Moreover, correction, like everything else in this program, is incremental. In one exercise, for example, you are presented with a picture of a piano keyboard and asked to use the joystick to place a dot on a series of keys identified by letter name. On a first mistake, a small arrow appears above the keyboard, its direction indicating whether the proper key is to be found higher or lower in the scale. On a second mistake, the keyboard is labeled with letter names, so you can find the proper answer if you look closely. On a third mistake, the proper key is indicated and the other labels disappear. Only after a fourth mistake does the program come right out and tell you the answer.

Rewards

To help you build "gut level" skills in each of the subject areas presented in *Atarimusic I and II* (and have a little fun in the process), three of the four disks in the series conclude with an edu-

cational arcade game. Note Attack, Stepwise Transporter, and Key Wars teach note recognition, intervals, and key signatures in time honored, blam-blam, shoot-'em-up, watch-out-for-the-missiles format. Level of difficulty can be altered so that the games can be played again and again as skills improve.

At first glance, you would think that these games were departures from the "error free" philosophy found elsewhere in *Atarimusic I* and *II*—after all, those missiles can kill! However, if you think about it, the games are revealed as beautifully consistent with the overall aims of the series. They supply the needed element of stress in this otherwise soft curriculum.

Instead of a game, the final disk in the series (*Atarimusic II*, disk 2) concludes

with a set of what are called "drills with goals," which help develop melodic memory, preparatory to practice in transcription. In a sense, these drills are the culmination of the series; more serious than an arcade game, they lead the student gently forward toward harmony, counterpoint, and composition.

The same brief manual, covering both *Atarimusic I* and *II*, is provided with each package in the series. The manual contains clear loading instructions, helpful hints, scoresheets for the various exercises, and a brief glossary of musical terms and phrases. All other information and instructions are where they should be—on the computer screen. Teachers using the packages in a crowded classroom need not worry that if a manual disappears, the programs will be rendered useless.

Conclusions

A brief review cannot begin to do justice to the subtlety and expertise that went into the construction of these programs. They are everything that good CAI should be: coherent, flexible, progressive, nonjudgmental, informative, and correct. Their consistency makes them admirably suited for use by individuals as stand-alone instruction or in combination with other instrumental or musical training.

They are also well-designed for consistent or occasional supplementary use in the classroom. In fact, were they to be themselves supplemented with appropriate keyboard and ear-training, *Atarimusic I* and *II* might well serve as the ideal interactive textbook for a beginning course in music theory, even at the university level. Bravo!

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It has been featured in *Fortune*, *Discover*, *The New York Times*, *The Wall Street Journal*, even on television; the Air Force wants to put it to work right away; universities are vying for Federal research grants to study it; investors are willing to sink millions of dollars into it; yet physicists aren't even sure how it works. The "it" is superconductivity, but the how is a mystery.

Explaining Superconductivity

The basic science of superconductors begins with the simple fact that the flow of electrons that makes up an electric current meets resistance as the electrons collide with the ions and atoms of the conducting material. The higher the temperature, the more energy and motion the conductor particles have, and the more likely they are to get in the way of the flowing stream of electrons.

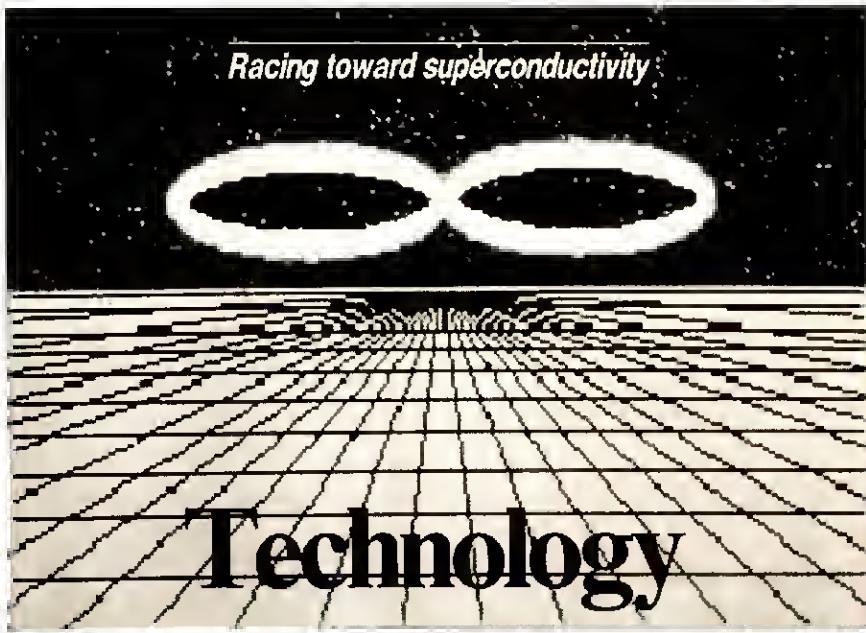
It is like walking through a milling crowd; eventually you will make it, but only after many collisions and diversions from your original direction, and in the process your temperature is likely to rise a few degrees.

Scientists have known these basic facts for many years, and they theorized that at extremely low temperatures, atoms of certain types of materials would line up—much like the atoms of a crystal—and provide orderly paths for the electrons to travel along. Dutch physicist Heike Kamerlingh Onnes was the first to observe this phenomenon in 1911 when he discovered that frozen mercury loses all resistance at the temperature at which helium changes from a gas into a liquid, about -452°F , just eight degrees above absolute zero.

Over the next 50 years, scientists developed several alloys of metals like mercury, germanium, and niobium and succeeded in nudging the temperature at which superconductivity begins up a little bit to -418°F . Curiously, these experiments indicated that not only did the electrons pass through the alloys unimpeded, but they actually seemed to pick up a bit of speed in the process.

This was not explained until 1957 when John Bardeen, Leon Cooper, and J. Robert Schrieffer finally figured out what was going on. Apparently, because opposites attract, when a negatively charged electron passes near a positively charged proton in the atomic lattice, it causes the lattice to bend slightly.

If a second electron moves into this bend in the lattice fast enough, it will roll toward the first with enough force



Racing toward superconductivity

Technology

By DAVID H. AHL

to overcome the normal electron repulsion and form a pair with the first electron. The paired electrons then move in unison as though connected by invisible strings, guiding and pulling each other along unhindered down the conductor. This is known as the BCS theory and, with minor variations, has stood the test of time.

The BCS theory chiefly explains superconductivity at extremely low temperatures when the atomic latticework has an orderly crystal-like structure and the electrons are paired. In 1986, however, several substances were found to exhibit superconductivity at temperatures well above the approximate -400°F upper limit of the BCS theory.

Theorists seem to be divided into two camps in trying to explain superconductivity at these higher temperatures. One group is refurbishing the old ideas and trying to apply them to the newer materials, while another group is looking to the new experiments themselves for clues.

Among the "refurbishers" are Chandra Varma and Stephen Schmitt-Rink of Bell Laboratories and Elihu Abraam of Rutgers University. They believe that the electron pairs, rather than being forced together by bends in the atomic latticework, are held together by a sort of electronic glue—called an *exciton*—strong enough to maintain the pairs at temperatures as high as 90°F .

Other scientists, including Michael Schlüter, also at Bell Labs, feel that the new materials are so strange that an entirely new explanation is required. For example, the first new superconducting material, discovered by Karl Alex Müller and Johannes Georg Bednorz of IBM's Zurich research laboratory, was a ceramic, similar to substances found in oven-proof cookware, composed of lanthanum, barium, copper, and oxygen. The substance is so electron-poor that it normally doesn't conduct electricity at all, but, astoundingly, it became a superconductor at -406°F .

After the results of this experiment were published, the race was on, and other groups at Tokyo University, Bell Labs, and the Institute of Physics in Beijing succeeded in raising the critical temperature to -388°F . Then in February 1987, Paul Chu at the University of Houston found another ceramic material that raised the critical temperature a whopping 95° to only -283°F —comfortably above the -320°F boiling point of liquid nitrogen.

How a solid reflects light tells much about its properties, and one of the strangest properties of these new superconductors, mostly ceramic oxides of copper with small amounts of rare earth elements added, is their failure to shine when polished. When light, which is essentially a stream of photons, hits the

The flow of electrons that makes up an electric current meets resistance as the electrons collide with the ions and atoms of the conducting material.

surface of a highly polished material, it is normally reflected back to the observer's eye. However, the protons apparently plunge deeply into the lattice-work of ceramic superconductors and are absorbed or dissipated so that the surface looks dull no matter how much it is polished. Some scientists believe that when they can explain this non-reflecting "electron topography," they will also be able to explain the superconducting properties of these materials.

Fabricating New Products

Most of the research on superconductors has been conducted on small disks of the new materials about the size of a nickel or smaller. As it turns out, it is relatively easy to make the compounds; even amateur scientists have made them at home using pottery kilns.

But making such materials useful is another matter. The race to commercialize superconductivity is concentrated in two areas: electronics, which needs only small amounts of the material in thin layers, and large electrical applications, which require great quantities of them in the form of wire.

Problem number one, which confronts both application areas, is that because of the crystalline nature of the ceramic oxides, they conduct electricity far better in a plane than at right angles to it. In the common nickel-size disks, for example, electricity flows easily horizontally from edge to edge, but hardly at all vertically from top to bottom.

This property, called *anisotropy*, especially complicates the efforts to make the materials handle the high current densities which are needed in closely packed integrated circuits and to generate strong magnetic fields. IBM researchers recently reported that a single large crystal can be made to carry relatively large currents, but for many practical applications it may be necessary to fabricate many thousands of precisely aligned crystals, like parallel rolls of coins, to provide direct paths for the current flow.

Some ideas for getting all the crystals aligned include using strong magnetic fields to help align them as they are

formed and laying down thin ceramic layers on precisely flat alloy surfaces.

A vexing problem for making integrated circuits is the toughness of the ceramics. Circuit patterns are normally made by etching through a mask (or stencil) into the layers of the chip. However, normal etching processes don't even scratch the surface—literally—of the ceramic superconductors.

Furthermore, some of the ceramics are chemically finicky. Exposure to common elements, sometimes even air, can completely erode their superconducting properties. Scientists fear that if thin layers of the ceramics are sandwiched between other materials, foreign atoms might leach in and poison the superconducting layers.

Making powerful magnets, a major application for superconductors, requires wire that is fine, strong, and flexible. Devices that create rapidly changing magnetic fields such as generators and particle accelerators require hair-fine wires. But the brittle ceramics cannot be drawn out as normal wire is; they must be fabricated initially into wire—currently a very difficult task.

Furthermore, existing superconducting ceramic wire is not flexible enough to be wound around a magnetic core or generator armature. But when it is wound into a coil before being baked into a superconductor, the coil breaks because it shrinks more than 20%. And combining the superconducting ceramic with other alloys is not the answer, because then it loses its superconductivity.

While the surface of the ceramic is hard, the structure itself is extremely brittle. Thus, it must be cushioned to prevent jarring and breakage. Not only

is this a problem with applications such as high speed levitated trains, but also with such seemingly gentle applications as magnetic resonance imaging (MRI) machines for hospitals. A major hazard of working with MRI machines with such powerful magnets is getting hit by objects accidentally pulled in from several feet away; the impact of such collisions could easily crack ceramic wire.

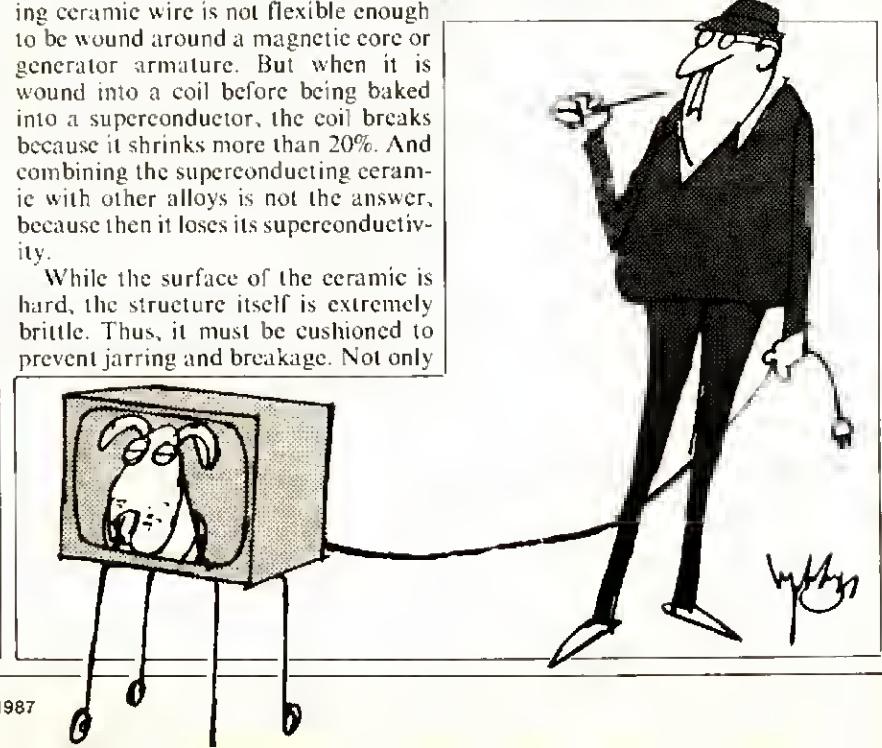
Potential Applications

While it is likely to be a decade or more before the new generation of high temperature superconductors begins to find its way into practical products, it is interesting to speculate on the products most likely to benefit from the phenomenon.

Power transmission. Between 8% and 15% of all electricity generated is wasted in transmission overcoming the resistance of the wires. Superconducting wires would recapture this wasted energy. Also, the use of superconducting wires would allow nuclear power plants to be built farther away from population centers, thereby increasing safety and, perhaps, public acceptance.

Storage of electricity. Giant coils of superconducting material could be used to make magnetic containment fields to store power generated at night when demand is low for use during peak daylight hours.

Faster, smaller computers. Superconducting chips and interconnecting wires could speed internal computing functions as well as allowing the machine to be more compact, because it



to put it.

One new company, tentatively named the American Superconducting Corp., has been formed with seed money from two venture capital firms to develop a business based on the work of Gregory Yurek and John Sande of MIT. The two professors claim to have found a way to make the new high temperature superconductors out of metal, which would make them much easier to manufacture than the ceramic materials.

Another small firm, Guernsey Coating Laboratories of Ventura, CA, founded five years ago to develop thin film technology, plans to coat objects with superconducting ceramics for researchers. Although the company has not yet perfected the process, a small ad in a physics journal recently drew dozens of inquiries.

Two other firms are already making superconductors based on the old supercooling technology. Hypress Inc. of Elmsford, NY, makes a high speed oscilloscope, while Biomagnetics Technologies Inc. of San Diego makes devices that generate virtually no heat.

High speed trains. Superconducting magnets on the bottoms of railroad cars would levitate them slightly off the rails, thus allowing smooth, quiet travel at speeds of 300 mph or more.

Brain scanners. The skull distorts the electrical currents of the brain, but the brain's magnetic waves pass through undisturbed. Superconducting materials could be used to measure these extremely faint magnetic fields to help diagnose certain mental illnesses.

Earth exploration. Like brain scanners, but on a larger scale, superconductors could be used in scanners to analyze the dim magnetic fields within the earth to find deposits of oil or minerals. Similar scanners could also be used to locate enemy submarines.

Satellite computers. Superconducting computers in satellites would be faster and have lower power requirements than current ones. This would be particularly valuable for Strategic Defense Initiative computers which will have to analyze information about potentially thousands of incoming missiles.

Investing in Superconductivity

If superconductivity sounds like the next transistor and you would like to invest some of your life savings in it, you are not alone. Many venture capitalists say they have seen enough to begin gearing up to lead what is likely to be-

come a multibillion-dollar wave of investment, even though right now there is far more money available than places vices that measure faint magnetic fields and brain activity.

Other than these few small companies, most of the players in the superconductivity game are universities and large companies like IBM and AT&T. But most analysts believe that in the long run smaller companies and startups are likely to play a major role.

New York State legislators, for example, have approved a \$5 million grant for a Superconductivity Institute at SUNY Buffalo. William Hoyt, chairman of the State Assembly Energy Committee, said he hoped to see a "Route 128 effect" that will create jobs and new industry, similar to those that have been established near Route 128 in the Boston area.

Texas recently designated the University of Houston as the site of a new \$4 million Center for Superconductivity, while Lehigh University in Bethlehem, PA, expects to raise \$400,000 from a dozen companies to fund superconductivity research at the school's materials research center. ■

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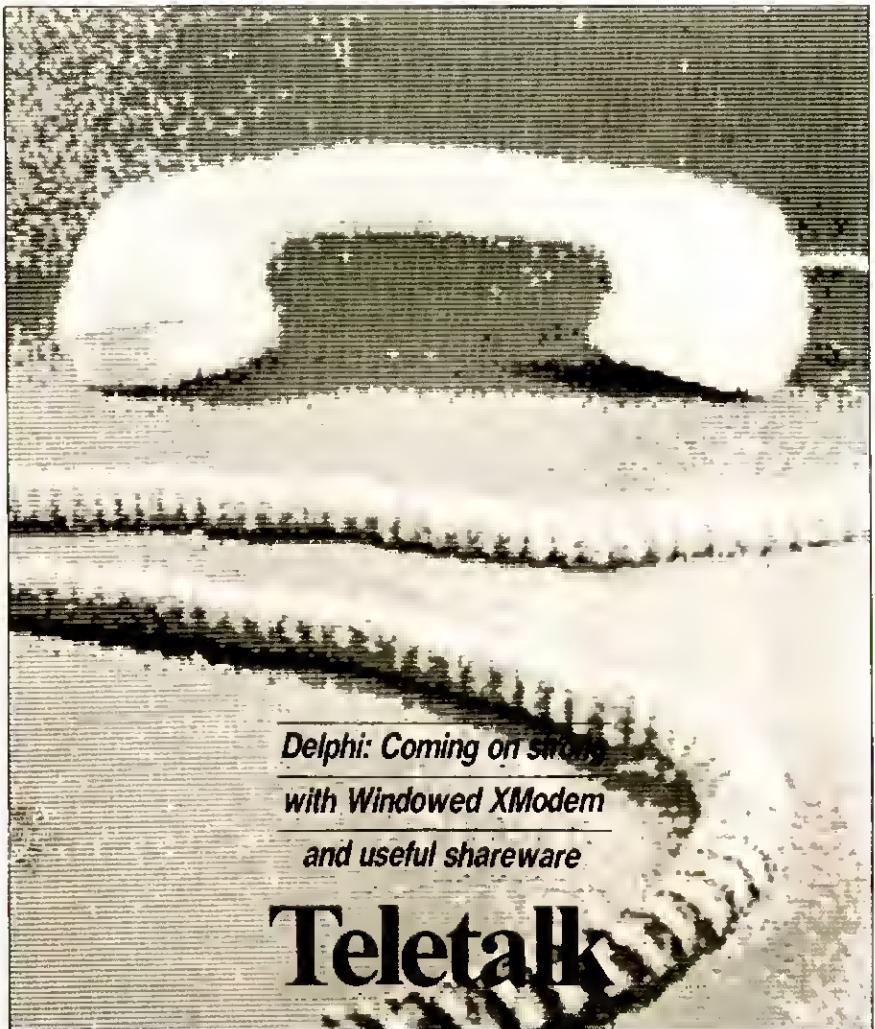
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*Delphi: Coming on strong
with Windowed XModem
and useful shareware*

Teletalk

By JOHN J. ANDERSON

Some months ago we reported in this column concerning Atari computer support from the Delphi online service. Delphi got a pretty good grade, although not quite as high as that we accorded to its sister services, CompuServe and Genie.

That seems to be changing: Delphi may soon be on top of the heap.

Delphi's Atari SIG remains much the same, although a nice new crop of files has turned up there (we shall examine a few up ahead). So what has marked Delphi's breathtaking transformation? Why is it now one of the best online buys for your money?

Windowed XModem

The answer is Windowed Xmodem. This new protocol (still labeled "experimental" at press time) is now available from Delphi. Windowed Xmodem is an

error-checking protocol that allows much faster downloads through packet-switched networks like Tymnet, which are used to access Delphi. The result is more code for less connect time. Better still, now you can go after those long files you have coveted but left untouched because you didn't want to wait an hour or more to get them.

Conventional Xmodem runs its error-checking by sending data in 128-byte blocks. Then it waits for the receiving hardware to send an acknowledgement code (sometimes called an ACK). While this does result in solid, error-free downloads, it takes time. Time you are paying for, regardless of which online service you may be using.

Windowed Xmodem (shortened to WXmodem) does not wait for an ACK on a block before it sends the next block. It can get up to four blocks ahead of the

receiver before it waits for an ACK to come down the line. If one does, (and even on the worst day it is likely that at least one ACK will have stacked up in the time it takes to transmit four blocks) it goes right on sending data. If a NACK comes up, meaning a block was missed (not acknowledged), Windowed Xmodem can actually back up and start sending again, starting with the errant block.

This approach is what makes the protocol "windowed." Don't look for grow boxes or drag bars here. The window we are talking about here is one of time, rather than space—the window of opportunity, as it were, for backtracking within the Xmodem protocol.

And it just so happens that in a packet-switched network like Tymnet, Windowed Xmodem affords just the right head start to the sending computer. You'll find download time dramatically decreased. Not twice as fast as it is with conventional Xmodem, but at least a third faster. That's 33% less download time, or 33% more data per minute.

At the same time, Delphi has also made available on an experimental basis the Ymodem protocol, which sends 1024-byte blocks instead of 128-byte blocks. Ymodem is more conventional in its format than Windowed Xmodem, and in fact works just like Xmodem, though in bigger swallows. After each block, it waits for an ACK. If you have a direct connect to a bulletin board, for example, over a solid line, Ymodem will be much faster than Xmodem, and faster too than Windowed Xmodem, which is really designed specifically for packet-switched networks. The problem with Ymodem is with noisy phone lines—when you do hit a NACK, you have a whole 1K of data to retransmit.

Shareware Worth Sharing

So. Wonderful, fine, and good. Delphi has been forward-looking enough to offer new protocols. But what good are those protocols going to do you if you have no way to receive them? You are running a terminal package that supports plain vanilla Xmodem and no more than that.

There is an answer for ST owners, and it takes only a few minutes of download time. TRANSFER.ACC, by T. Zerucha of Southfield, MI, is a shareware desk accessory that gives you the capability to download and upload in Xmodem, Ymodem, and Windowed Xmodem. It works with most popular terminal programs, and I can personally

report that it works just peachily from Flash.

You can bring events up to the moment of download in the usual fashion, then, rather than initiating a receive in the conventional manner, pull down the WXY Modem desk accessory. You can download a file from there in any supported protocol. You can also tailor some other facets of the procedure from the accessory itself.

WXY Modem is a fine example of shareware that is well worth the \$5 to \$20 its author requests. Download the program, then send him the money.

Now you're rolling. You're on Delphi, which has recently rolled back its rates. You are now capable of downloading using the very latest in fast protocol technology. Now what should you download? There are dozens of worthwhile programs available from the Delphi Atari SIG. Let's have a look at just a few of the very latest additions.

You might have a look at SCHIZO.PIT, a control panel replacement in shareware by John Ogawa. This desk accessory offers dynamic control of disk verify, screen color, keyclick, bell, disk seek rate, double click speed, and serial and printer port configuration, along with a facility to set clock and calendar. The SCHIZO accessory evokes itself upon power up, so you can get the time and date straight without undue effort—a very nice desk accessory and immensely preferable to the original control panel. The program also allows control over the printer port without taking up an extra accessory slot on the GEM desktop. Mr. Ogawa asks for \$10 to \$15 if you decide to keep the program.

DSLIDE.PIT is a full-featured slide show program by John Brochu, of Peabody, MA. It supports *NeoChrome*, *Degas*, *Degas* compressed, and *Tiny* picture formats. Deluxe Slide Show 1.1 allows you to load and display images on either the color or monochrome ST monitor (via some nice dithering routines), and offers full color cycling animation support. The program accomplishes resolution switching automatically, supports optional script files, and allows pathnames to be included in a script, so slide shows can be made up from more than a single drive's worth of images (a nasty limitation of NEOSHOW). Titles automatically display with maximum contrast.

The only real limitation of the program is that it supports only straight cuts between slides, but Mr. Brochu is

If you're the kind of person who thinks it would be neat to have 34 different digitized sounds from "Star Trek" at your fingertips, why not go for it?

already hard at work on an enhanced version of the program. A very nice effort for those involved in ST graphics presentations.

Mr. Brochu's real claim to fame, however, is PicSwitch 0.7, available on Delphi as PICSW7.PIT. This is a graphics conversion program that allows your ST to display *MacPaint* files, Mac Startup Screens, Amiga IFF files, CompuServe RLE files, and Atari 8-bit files in graphics 8, 9, Koala-MicroIllustrator, and MicroPainter formats. The program can save these files in all standard ST graphic formats. A fantastic tool. John promises that version 1.0, running completely under GEM, will be ready soon.

Other Goodies

If you are a GFA Basic nut, you won't want to miss GFAGEM.BAS by Paul Chinn. It offers a set of GEM routines in GFA Basic including a nearly complete set of GEM AES calls. If you like the simplicity of GFA but miss the power to make GEM strut all its stuff, this set of routines may be indispensable to you.

If it is an audio diversion you seek, Delphi has two programs for you. R.PRG is a demo of Michtron's *ST Replay* sound digitizer, and it is a knockout. The ST delivers fully digitized, FM quality sound, and the demo will leave you drooling for more. This one takes half an hour to download, even with WXmodem, so be prepared to do a bit of waiting.

Then there is TREKTALK.PRG. This one also takes a while to download, and you'll have to decide for yourself whether it's worth it. But if you're the kind of person who thinks it would be neat to have 34 different digitized sounds from "Star Trek" at your fingertips, why not go for it? From Kirk's "Red Alert, this is not a drill," to Scott's "The engines canna' take much more o' this," to Spock's "Fascinating, Captain," this program is guaranteed to make you smile.

A complete set of Trek sound effects is also included. The photon torpedoes are impressive, but I have always loved

the sound of the sliding doors opening and closing.

To round off this month's column, we've got to tell you about another program that really left us smiling. It is called AMIGAEM.PIT on Delphi, and is a tongue-in-cheek Amiga emulator for your ST. Written by Philip L. Nelson in compiled GFA Basic, screen rendition is uncanny, and you can even click from the Workbench to Preferences and Basic. But the real fun comes when you click on the Amiga's own ST emulator, resulting in a spectacular simulated crash and "guru meditation."

For more information on Delphi, call (voice, that is) (800) 544-4005. ■

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In our last issue, we reviewed Atari Corp.'s educational ST programs for young learners and found them worthy of your attention. In this issue, we will discuss a new series for older students.

The Arrakis Advantage Scholastic Series from Atari was designed by Arrakis Technologies, a Canadian software development firm. The series currently consists of 17 educational tutorials covering topics in math and the sciences and designed for both home and classroom use.

We received *Algebra I*, Volume 1; *Geometry*, Volume 1; and *Biology*, Volume 2. A careful review of all three revealed that they are all of the same high quality and that the user interface (or "learning environment") is consistent throughout the series.

About Socrates

That learning environment, called Socrates, is one of the things that makes the series special. It allows you to communicate with the computer by asking questions, just as you would if a human teacher were presenting the material.

Each screen consists of a "teaching window," an "answer line," and a "directions window." At any given time, the teaching window contains either instructional material or a question to which you can respond by typing on the answer line.

If the explanation or question in the teaching window includes a term or concept that you don't understand, you can

Scholastic Series

System: Atari ST
(color or monochrome)
Price: \$19.95
Summary: Outstanding
tutorials in math
and the sciences.
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Atari Corp.
P.O. Box 61657
Sunnyvale, CA 94088
(408) 745-2367

CORRECT

**Atari
introduces
the Arrakis
Advantage
to the ST
classroom**

Atari Classroom

By BETSY STAPLES

By measuring the angle of a hill, you can determine if the hill is safe to ski.



Example of measure

Press RETURN to continue or press HELP



Tutorial Screens

The heart of each lesson is the series of tutorial screens that present the material to be mastered. Each lesson starts with an introduction to the topic, followed by definitions and examples.

Frequently, the examples are illustrated with animated graphics and color (if you have a color monitor). An example of the use of measurement at the beginning of the *Geometry* program says that "by measuring the angle of a hill, you can determine if the hill is safe to ski." Alongside that text, a skier zooms down a 40-degree slope.

request—in plain English, rather than adventurespeak, if you want—a definition, more information, or a complete review. When you understand the terms and concepts involved, you return to the point at which you left off and continue with the lesson.

If, on the other hand, you think you know it all, you can skip ahead to another lesson or go right to the final exam.

Special symbols—an α or $\sqrt{ }$, for example—that are not on the keyboard but may be required in your answers can be made to appear on the screen by pressing Control and a designated letter. A list of the special symbols used in the current lesson and how to type them can be displayed at your request.

The directions window offers a brief description of what is going on above and tells you what to do next ("Press Return to continue or press Help").

SCORE
Disk 1
Digestion and Nutrition

INTRODUCTION	MOUTH	TEETH	SALIVARY GLANDS	ESOPHAGUS	STOMACH	needs work
mastery	mastery	mastery	incomplete	incomplete	(cont'd)	mastery

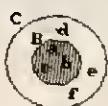
Digestion and Nutrition
Disk 1
Press RETURN to continue or press HELP

A SUPERSET is:
 * a set which contains
 ALL the elements of
 another set
 and
 * at least ONE MORE
 element



Definition of superset

Press RETURN to continue or press HELP



If $B = \{a, b, c\}$ and
 then B is a subset
 of C .
 It is notated as
 $B \subset C$

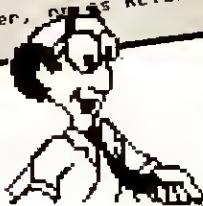
Example of subsets

Press RETURN to continue or press HELP

- Which statement is correct?
 1) $D = \{2, 6\} \subset E = \{1, 2, 3, 4\}$
 2) $D = \{2, 6\} \subset E = \{1, 2, 3, 4\}$

Test of subsets

Type your answer, press RETURN



**More than just drill
 and practice, these packages
 are complete minicourses that
 can be used to supplement
 classroom instruction.**

When all the information pertaining to a given concept has been presented, test questions challenge your mastery of that concept. The questions take variety of forms—multiple choice, fill in the blank, straight question and answer, and what I will call for lack of a better name, "graphic participation" in which you use the mouse to manipulate elements on the screen according to directions.

When you answer a question, you receive immediate feedback in the form of a graphic that tells whether your answer was correct or incorrect. There were two different feedback graphics in the packages we reviewed: a hand that stamped either CORRECT or INCORRECT and a dart that either hit the bull's eye or landed completely off the target. If you make a mistake, the next screen explains the correct answer, and some of the programs allow you to try the question again.

Unfortunately, the feedback doesn't distinguish between an answer that is incorrect because you have made a careless mistake and one that is incorrect because you have misunderstood the concept. The explanation is the same, whether you completely miscalculated or simply left off "square units" when discussing area.

Now, I am the first to agree that credit should not be granted for misspelled answers and that carelessness should count for as much (or as little) as incompetence, but a human teacher would most assuredly respond differently to different kinds of mistakes, and it's a shame that Socrates falls short here.

And while we are dealing with shortcomings, the only other one worthy of mention is also associated with the test and exam modes. There is no consistency in the labeling of answers for multiple choice questions. One question will ask you to choose a, b, c, or d; another, 1, 2, 3, or 4; and yet another, A, B, C, or D. This is not a major failing, merely an unnecessary distraction.

The program keeps track of your score on the questions that follow the lessons, grading each one "mastery," "needs work," or "incomplete." After you have taken the final exam, that score, expressed as a percentage, is also displayed on the score screen. You can check your scores at any time.

If you quit partway through the tutorial, your score is saved, and when you load the program again, the tutorial picks up where you left off. There is, however, no way to save more than one set of scores, so this feature is of little

use in the classroom, where more than one student is using the program.

Documentation

The documentation for all programs in the series is the same 44-page manual. The first half of the booklet is devoted to Socrates and the instructions that apply to the entire series. The second half, the Guide to the Tutorials, devotes a page or two to each individual package.

The guide to each package includes a description of the tutorial, including prerequisites; grade parallels, indicating the grade levels for which the tutorial is designed and the grade levels for which it is considered enrichment and remediation; learning objectives; concepts discussed; special commands, if any; special symbols used, if any; and unique features, if any.

The explanations and instructions in the professionally typeset manual are clear and well written; there are no misspellings or grammatical errors to make you question the intelligence or education of those who prepared the packages.

The programs are, for the most part, self-documenting, and all information except grade levels and objectives is found right on the disk, so you will probably not spend too much time perusing the manual.

It is a tribute to the simplicity and consistency of the programs that one small manual can provide adequate documentation for 17 packages.

Now let's have a closer look at the three packages we reviewed.

Algebra I

Algebra I, Volume 1, covers sets and notation. The following are discussed: sets, Venn diagrams, roster form, partial listing, selector method, epsilon symbol, finite sets, infinite sets, empty sets, equivalent sets, equal sets, subsets, supersets, disjoint sets, intersection of sets, and union of sets.

The grade level at which the package is aimed is 6-7. It can, however, be used for enrichment in grade 5 and remediation in grades 8-9. And I know at least one college graduate, whose grade school career predated the new math, who learned a great deal from the program.

Learning objectives for *Algebra I* include the following: identify sets of elements or numbers, distinguish various forms of set notation, write set notation, describe different types of sets, identify relationships between sets, and form new sets.



To find the length of fence needed to enclose this garden, you must determine its perimeter.

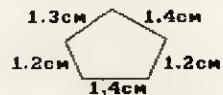


- * The LENGTH of a side is the distance between the beginning and end of that side
- * It is measured with a ruler, or other such instrument
- * Length is always represented by a number and a unit, such as inches or meters.

of Perimeter
N to continue or press HELP

Definition of the length of sides
Press RETURN to continue or press HELP

What is the perimeter of this figure?



6.5cm

Test of perimeter

Answer this question, and press RETURN

Other packages in the *Algebra* series cover number systems, equations and formulas, linear relations, and polynomials.

Geometry

Geometry, Volume 1, deals with basic geometrical notation. After completing this tutorial, you should be able to calculate the perimeter, area, and volume of plane figures; identify geometric elements, including points, lines, planes, and angles; distinguish between congruence and similarity and use both in simple plane geometry; and identify and work with transformations.

The concepts discussed in this tutorial, which is designed for grades 7 and 8, include introduction to geometry, measurement, perimeter, area, volume, point, line, plane, postulates, angle, congruence, and transformation.

Geometry, Volume 2, is an introduction to plane and space geometry, designed for grades 8 and 9.

Biology

Biology, Volume 2, teaches the rudiments of digestion and nutrition. Aimed at students in grades 10 and 11, it features a great many animated graphics.

Topics covered include introduction to digestion, mouth, teeth, tongue, salivary glands, esophagus, stomach, ulcers, pancreas, liver and gallbladder, small intestine, large intestine, nutrients, exercise, sleep, and weight control.

After completing this tutorial, you should be able to describe the parts and functions of the digestive system, list and describe the digestive processes that occur in each section of the digestive tract, discuss the role of enzymes in energy production, list and discuss the six categories of nutrients and their food sources, discuss the role of vitamins in maintaining health, and describe the

activities that contribute to good health.

Other topics covered in the biology series are respiration, reproduction and development, and circulation and the heart. Other subject areas for which the Scholastic Series packages are available are chemistry, physics, statistics, and trigonometry.

Conclusion

The Scholastic Series from Atari is one of the few educational programs I have seen from which you can actually learn new material. Much more than just drill and practice, these packages, are complete minicourses that can be

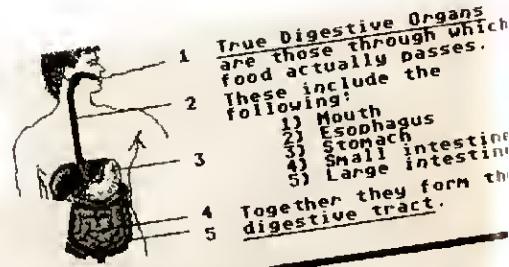
used effectively to supplement classroom instruction.

The three packages we reviewed were of very high quality, and we have no reason to doubt that the others in the series are equally well done.

Each package includes two disks in a sturdy plastic binder and represents an outstanding value at \$19.95. ■

- A Try this experiment.
Find these four things:
B A) Sugar
 B) Vinegar
 C) Salt
 D) Tonic water with quinine
- C Put a bit of each on the tip, sides, and back of your tongue to see where you receive the greatest taste sensation.
- D

Experiment with the Tongue
Press RETURN to continue or press HELP



Example of Digestion

press RETURN to continue or press HELP



Adult human beings normally have 32 teeth, 16 in each jaw.

Introduction to Teeth
Press RETURN to continue or press HELP

- The tongue has several functions:
- * It is an organ of taste
 - * It helps in the chewing process
 - * It helps in the swallowing process
 - It keeps the inner surface of the teeth clean
 - It is essential for speech

Function of the Tongue

RETURN to continue or press HELP

Puzzles & Problems

ANSWERS

Questions are on page 36.

Bobbi's New Car

First, it is necessary to determine the monthly loan payment. While there are tables (and formulas) to do this, it can also be done with a short computer pro-

gram (Listing 1). The program is exactly the opposite of a systematic savings program. In this program, the principal starts at \$16,000 and decreases each month by the monthly payment, M. Interest is computed each month and the new balance calculated in Line 70.

If you experiment with different values of M until the loan is paid off in exactly 48 months with no leftovers, you will find that the monthly payment is \$405.81. You then multiply \$405.81 by 48 to find the total amount paid for the car (\$19,478.88). By subtracting \$16,000, you get the amount of interest (\$3478.88).

Next, by modifying the program very slightly (Listing 2), we can determine how much Bobbi would get by investing the \$16,000 in a 7% CD for four years. The amount comes to \$21,152.90. Thus, the interest from the CD is \$5152.90, or exactly \$1674.02 more

than the interest on the car loan. So the dealer was right—or was he?

The fallacy in the dealer's reasoning is that he assumed that if Bobbi paid for the car with cash, she then would not invest the money she otherwise would have been using to make car payments. However, let's say that Bobbi, being a thrifty person, decided to put the amount of the car payment in the bank each month for 48 months at the current 5.5% passbook rate.

Again, by changing the program very slightly (Listing 3), we can determine that her balance in four years is \$21,732.30, of which \$5,732.30 is interest.

Thus, by using the dealer's approach, at the end of four years, Bobbi would have \$21,152.90, while by paying for the car in cash and putting the equivalent payments in the bank, she would have \$21,732.30, or \$579.40 more.

Listing 1.

```

10 R=.1/12 : REM 10% INTEREST RATE
20 P=16000 : REM $16,000 PRINCIPAL
30 PRINT "MONTHLY PAYMENT";
40 INPUT M
50 N=0 : REM MONTH ZERO
60 N=N+1 : REM AOO 1 TO MONTH
70 P=P*(1+R)-M : REM PAYING PRINCIPAL
80 IF P>0 THEN 60 : REM PAID OFF YET?
90 PRINT N;" MONTHS ":"-P;" LEFTOVER"
100 GOTO 20 : REM TRY AGAIN

```

Listing 2.

```

10 R=.07/12 : REM 7% INTEREST RATE
20 P=16000 : REM $16,000 PRINCIPAL
30 FOR N=1 TO 48 : REM 48 MONTHS
70 P=P*(1+R)
80 NEXT N
90 PRINT P;" PRINCIPAL IN 4 YEARS"

```

Listing 3.

```

10 R=.055/12 : REM 5.5% INTEREST RATE
20 P=0 : REM NO PRINCIPAL TO START
30 M=405.81 : REM MONTHLY PAYMENT
60 FOR N=1 TO 48 : REM 48 MONTHS
70 P=P*(1+R)+M
80 NEXT N
90 PRINT P;" PRINCIPAL IN 4 YEARS"

```

Square Difference

The short program in Listing 4 would seem to solve the problem with an answer of 438 numbers that cannot and 562 that can be formed as the difference of two squares.

You might want to consider why we calculated squares to 10,000 when we only wanted to know about numbers in the range of 1 to 1000? The reason is simply that numbers toward the top of the range can be formed from the difference of squares outside of the range such as $199 = 10,000 - 9801$.

Actually, the solution provided by the program is wrong, because the number 999, the largest in the range of interest, is the difference of 500^2 minus 499^2 . Thus, we must increase the FOR range for I from 100 to 500.

We did this and made a few other changes to make the program more efficient (Listing 5). The computer then calculated the correct answer of 748 cans and 252 cannons. The numbers

that cannot be written as the difference of two squares are 1, 2, 4, 6, 10, 14, and every fourth number from there on. We leave it to you to explain why this is so.

Listing 4.

```

5 DIM K(10000)
10 FOR I=2 TO 100
15 IQ=I^2
20 FOR J=I-1 TO 1 STEP -1
25 S=IQ-J^2
30 IF S>1000 THEN 50
35 K(S)=1
40 NEXT J
50 NEXT I
60 FOR I=1 TO 1000
70 IF K(I)=0 THEN C=C+1
80 NEXT I
90 PRINT "CANNONS=";C

```

Listing 5.

```

5 DIM K(1000)
10 FOR I=2 TO 500
15 IQ=I^2
20 FOR J=I-1 TO 1 STEP -1
25 S=IQ-J^2
30 IF S>1000 THEN 50
35 K(S)=1
40 NEXT J
50 NEXT I
60 FOR I=1 TO 1000
70 IF K(I)=0 THEN C=C+1
80 NEXT I
90 PRINT "CANS=";C

```


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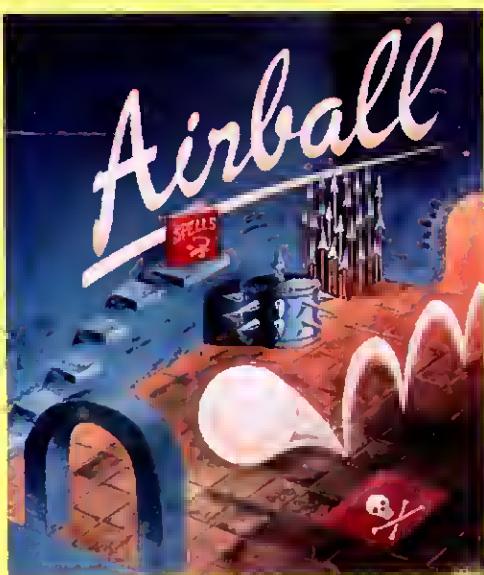
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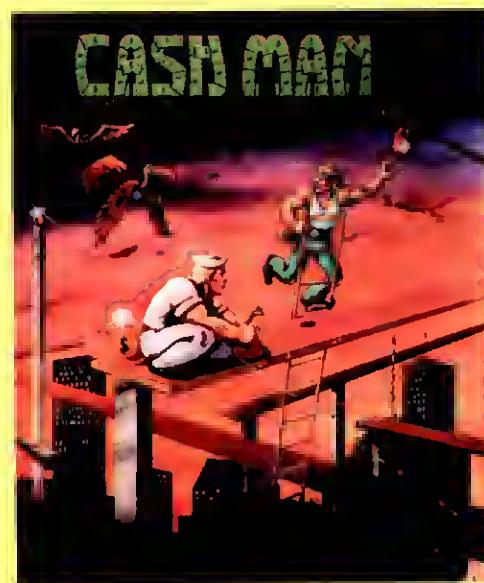
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